H01J
ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps H01T; arc lamps with consumable electrodes H05B; particle accelerators H05H)

Definition statement
This place covers:
• Devices, i.e. electric discharge tubes or discharge lamps, for producing, influencing, or using a flow of electrons or ions, and having a closed or substantially closed casing containing a chosen gas, vapour, or vacuum, upon the pressure and nature of which the characteristics of the device depend. Examples include devices for controlling, indicating, or switching electric current, counting electric pulses, producing light or other electromagnetic oscillations, such as X-rays, or for separating or analysing radiation or particles.
• Details of electric discharge tubes or discharge lamps, including details applicable to both discharge devices and incandescent lamps.
• Apparatus or processes specially adapted for the manufacture of electric discharge tubes, discharge lamps, or parts thereof, including apparatus and processes for manufacture applicable to both discharge devices and incandescent lamps.
• Recovery of material from discharge tubes or discharge lamps.

In particular:
AC-PDP
DC-PDP
Vacuum tubes
Transit-time tubes, e.g. Klystrons, travelling wave tubes, magnetrons
Ion beam tubes
Cathode ray tubes and electron beam tubes, in particular electron emission (e.g. field emission) display panels
Discharge tubes with provision for emergence of electrons or ions from the vessel
X-ray tubes
Discharge tubes with provision for introducing objects or material to be exposed to the discharge
Photoelectric discharge tubes not involving the ionisation of gas
Discharge tubes for measuring pressure of introduced gas or for evacuation by diffusion of ions
Secondary emission tubes or electron-multiplier tubes
Discharge tubes functioning as thermionic generators
Tubes for determining the presence, intensity or energy or radiation or particles
Particle spectrometer or separator tubes
Gas- or vapour-discharge lamps
Cathode-ray or electron stream lamps, in particular flat panel electron emission lamps as LCD backlight
Lamps without any electrode inside the vessel or with at least one main electrode outside the vessel
Apparatus or processes specially adapted to the manufacture thereof

### References

#### Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emission spectrometry</td>
<td>G01J 3/443</td>
</tr>
<tr>
<td>Electrical connectors separable from the tube</td>
<td>H01R</td>
</tr>
<tr>
<td>Spark gaps, including gas-filled spark gaps</td>
<td>H01T</td>
</tr>
<tr>
<td>Arc lamps with consumable electrodes</td>
<td>H05B</td>
</tr>
<tr>
<td>Plasma discharge EUV light sources in which a gas is locally compressed to create a discharge space and then allowed to expand into a vacuum</td>
<td>H05G</td>
</tr>
<tr>
<td>Particle accelerators</td>
<td>H05H</td>
</tr>
</tbody>
</table>

#### Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isotope separation using separate tubes</td>
<td>B01D 59/44</td>
</tr>
<tr>
<td>Investigating or analyzing electrically excited material, e.g. electroluminescence</td>
<td>G01N 21/66</td>
</tr>
<tr>
<td>Analyzing materials by investigating the ionization of gases; by investigating electric discharges, e.g. emission of cathode</td>
<td>G01N 27/62</td>
</tr>
<tr>
<td>Mass spectrometers specially adapted for column chromatography</td>
<td>G01N 30/72</td>
</tr>
<tr>
<td>Investigating or analyzing surface structures in atomic ranges using scanning-probe techniques</td>
<td>G01Q 10/00 - G01Q 90/00</td>
</tr>
<tr>
<td>Details of scanning-probe apparatus in general</td>
<td>G01Q 10/00 - G01Q 90/00</td>
</tr>
<tr>
<td>Contactless testing of electronic circuits using electron beams</td>
<td>G01R 31/305</td>
</tr>
<tr>
<td>Electrostatic dosimeters in general</td>
<td>G01T 1/14</td>
</tr>
<tr>
<td>Secondary-emission measurement of nuclear or X-radiation</td>
<td>G01T 1/28</td>
</tr>
<tr>
<td>Gas lasers pumped by electric discharges</td>
<td>H01S</td>
</tr>
<tr>
<td>Generating ions to be introduced into non-enclosed gases</td>
<td>H01T 23/00</td>
</tr>
<tr>
<td>Tubes for generating potential differences by charges carried on a gas stream</td>
<td>H02N</td>
</tr>
<tr>
<td>Light sources using a combination of discharge and other kinds of light generation (other than those covered in group H01J 61/96)</td>
<td>H05B 35/00</td>
</tr>
<tr>
<td>Generating plasma in general</td>
<td>H05H 1/24</td>
</tr>
</tbody>
</table>

#### Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid crystal displays (LCD)</td>
<td>G02F 1/13</td>
</tr>
<tr>
<td>Electric incandescent lamps</td>
<td>H01K</td>
</tr>
<tr>
<td>Displays using organic light-emitting diodes (OLED)</td>
<td>H01L 27/32</td>
</tr>
</tbody>
</table>
Special rules of classification

In this subclass, groups H01J 1/00-H01J 7/00 relate only to:

- Details of an unspecified kind of discharge tube or lamp, or
- Details mentioned in a specification as applicable to two or more kinds of tubes or lamps as defined by groups H01J 11/00-H01J 17/00, H01J 21/00, H01J 25/00-H01J 27/00, H01J 31/00-H01J 41/00, H01J 47/00-H01J 65/00, hereinafter called basic kinds.
- A detail only described with reference to or clearly only applicable to discharge tubes or discharge lamps of a single basic kind is covered by the detail group appropriate to discharge tubes or discharge lamps of that basic kind, wherein plasma display panels of H01J 11/00, H01J 17/00, electron emission display panels of H01J 31/00 and flat panel electron emission lamps as LCD backlight of H01J 63/00 are considered as a single basic kind.

In this subclass, group H01J 9/00 relates to apparatus or processes specially adapted for the manufacture of electric discharge tubes, discharge lamps, or parts thereof.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

<table>
<thead>
<tr>
<th>Term</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamp</td>
<td>In this subclass, &quot;lamp&quot; includes tubes emitting visible, ultra-violet or infra-red light.</td>
</tr>
<tr>
<td>Spark Gap</td>
<td>A &quot;spark gap&quot; is an enclosed or non-enclosed discharge device having cold electrodes and used exclusively to discharge a quantity of electrical energy in a small time duration.</td>
</tr>
<tr>
<td>Spectrometer</td>
<td>An instrument used to disperse radiant energy or particles into a spectrum and measure properties such as wavelength, mass, energy, or index of refraction.</td>
</tr>
</tbody>
</table>

H01J 1/00

Details of electrodes, of magnetic control means, of screens, or of the mounting or spacing thereof, common to two or more basic types of discharge tubes or lamps (details of electron-optical arrangements or of ion traps H01J 3/00)

Definition statement

This place covers:

Details of electrodes, or magnetic control means, of screens, or of the mounting or spacing thereof, of an unspecified kind of discharge tube or discharge lamp, e.g. a CNT-based field emission device, or of two or more kinds of discharge tubes or discharge lamps as defined by groups H01J 11/00, H01J 13/00, H01J 15/00, H01J 17/00, H01J 21/00, H01J 25/00, H01J 27/00, H01J 31/00, H01J 33/00, H01J 35/00, H01J 37/00, H01J 40/00, H01J 41/00, H01J 43/00, H01J 45/00, H01J 47/00, H01J 49/00, H01J 61/00, H01J 63/00 or H01J 65/00, hereinafter called basic kinds, wherein plasma display panels of H01J 11/00, H01J 17/00, electron emission display panels of H01J 31/00 and flat panel electron emission lamps as LCD backlight of H01J 63/00 are considered as a single basic kind.

References

Limiting references

This place does not cover:

Details of electron-optical arrangements or of ion traps [H01J 3/00]
Details only described with reference to or clearly only applicable to discharge tubes or discharge lamps of a single basic kind

H01J 11/00, H01J 13/00, H01J 15/00, H01J 17/00, H01J 21/00, H01J 25/00, H01J 27/00, H01J 31/00, H01J 33/00, H01J 35/00, H01J 37/00, H01J 40/00, H01J 41/00, H01J 43/00, H01J 45/00, H01J 47/00, H01J 49/00, H01J 61/00, H01J 63/00, H01J 65/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Apparatus or processes specially adapted for the manufacture of details of H01J 1/00</th>
<th>H01J 9/00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrodes and electron emitters</td>
<td></td>
</tr>
<tr>
<td>Microstructural devices or systems and manufacture thereof</td>
<td>B81B, B81C</td>
</tr>
<tr>
<td>Nanostructures and manufacture thereof</td>
<td>B82B</td>
</tr>
<tr>
<td>Nanotechnology</td>
<td>B82Y</td>
</tr>
<tr>
<td>Carbon and compounds thereof; manufacture thereof, e.g. carbon nanotubes [CNT] and manufacture thereof</td>
<td>C01B 32/00, C01B 32/158</td>
</tr>
<tr>
<td>Metal coating of glasses</td>
<td>C03C 17/06</td>
</tr>
<tr>
<td>Multilayer metal coating of glasses</td>
<td>C03C 17/36</td>
</tr>
<tr>
<td>PZT (lead zirconate titanate) emitter materials and manufacture thereof</td>
<td>C04B 35/491</td>
</tr>
<tr>
<td>Metallurgy</td>
<td>C21, C22</td>
</tr>
<tr>
<td>Metal alloys</td>
<td>C22C</td>
</tr>
<tr>
<td>Coating (e.g. of metal or dielectric materials)</td>
<td>C23C</td>
</tr>
<tr>
<td>Deposition of carbon by e.g. chemical vapour deposition</td>
<td>C23C 16/26</td>
</tr>
<tr>
<td>Electrolytic or electrophoretic production of coatings, e.g. of CNT and carbon fibres on a substrate</td>
<td>C25D, C25D 15/00</td>
</tr>
<tr>
<td>Secondary-emission detectors for measurement of nuclear or X-radiation</td>
<td>G01T 1/28</td>
</tr>
<tr>
<td>Photolithographic production of patterned surfaces; photosensitive materials thereof</td>
<td>G03F 7/00</td>
</tr>
<tr>
<td>Conductors or conductive bodies characterised by the conductive materials; Selection of materials as conductors</td>
<td>H01B 1/00</td>
</tr>
<tr>
<td>Filaments for incandescent lamps</td>
<td>H01K 1/02</td>
</tr>
<tr>
<td>Luminescent screens</td>
<td></td>
</tr>
<tr>
<td>Luminescent materials or compositions</td>
<td>C09K 11/00</td>
</tr>
</tbody>
</table>
Special rules of classification

- Details are classified in H01J 1/00 and - in case of a more detailed relevant Indexing Code subgroup - also in H01J 2201/00.
- If in field emission devices the cathode structure or material is the relevant detail, classification is provided in H01J 1/30-H01J 1/316 and, where applicable, H01J 2201/30-H01J 2201/317. If however the control electrode structure of the field emission devices (i.e. form/structure, material or relative arrangement of the gate electrode(s) or the focussing electrode(s)) is the relevant detail, classification is provided in H01J 3/021-H01J 3/022 and, where applicable, H01J 2203/0204-H01J 2203/0292. If the cathode structure or material of a general field emission device and of a field emission display or a flat panel electron emission lamp (as LCD backlight) is disclosed, classification is provided in H01J 1/30-H01J 1/316 and in H01J 29/04, H01J 2329/04-H01J 2329/0492, H01J 31/127 or H01J 63/00.
- Carbon nanotube (CNT) emitters are classified in H01J 1/304 and H01J 2201/30469, the manufacture thereof in H01J 9/025. When the CNT material or the manufacture thereof is of interest, also C01B 32/00 or C01B 32/158 is assigned. PZT (lead zirconate titanate) emitter materials are classified in the respective ECLA subgroup of H01J 1/30, e.g. H01J 1/316, in H01J 2201/306 and C04B 35/491.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FED</td>
<td>field emission device / display</td>
</tr>
<tr>
<td>CNT</td>
<td>carbon nanotube(s)</td>
</tr>
</tbody>
</table>

H01J 1/22

Heaters (filaments for incandescent lamps H01K 1/02)

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Reference</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating arrangements for discharge tubes with liquid-pool cathodes</td>
<td>H01J 13/32</td>
</tr>
<tr>
<td>Filaments for incandescent lamps</td>
<td>H01K 1/02</td>
</tr>
</tbody>
</table>

H01J 1/312

having an electric field perpendicular to the surface, e.g. tunnel-effect cathodes of Metal-Insulator-Metal [MIM] type {H01J 1/304 - H01J 1/308 take precedence}

References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Reference</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field-emissive cathodes</td>
<td>H01J 1/304</td>
</tr>
<tr>
<td>Semiconductor cathodes, e.g. cathodes with PN junction layers</td>
<td>H01J 1/308</td>
</tr>
</tbody>
</table>
H01J 1/32

Secondary-electron-emitting electrodes (H01J 1/35 takes precedence; luminescent screens H01J 1/62; charge storage screens in general H01J 1/78; charge storage screens using secondary emission for image tubes H01J 29/41; dynodes for secondary emission tubes H01J 43/10; secondary-emission detectors for measurement of nuclear or X-radiation G01T 1/28)

References

Limiting references

This place does not cover:

Electrodes exhibiting both secondary emission and photo-emission \( \text{H01J 1/35} \)

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Luminescent screens ( \text{H01J 1/62} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charge storage screens in general ( \text{H01J 1/78} )</td>
</tr>
<tr>
<td>Charge storage screens using secondary emission for image tubes ( \text{H01J 29/41} )</td>
</tr>
<tr>
<td>Dynodes for secondary emission tubes ( \text{H01J 43/10} )</td>
</tr>
<tr>
<td>Secondary-emission detectors for measurement of nuclear or X-radiation ( \text{G01T 1/28} )</td>
</tr>
</tbody>
</table>

H01J 1/34

Photo-emissive cathodes (H01J 1/35 takes precedence; photoelectric screens H01J 1/78)

References

Limiting references

This place does not cover:

Electrodes exhibiting both secondary emission and photo-emission \( \text{H01J 1/35} \)

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Photoelectric screens ( \text{H01J 1/78} )</th>
</tr>
</thead>
</table>

H01J 1/42

Cooling of anodes (cooling rotary anodes \( \text{H01J 1/44} \)); Heating of anodes

References

Limiting references

This place does not cover:

Cooling rotary anodes \( \text{H01J 1/44} \)
H01J 1/46
Control electrodes, e.g. grid (for igniting arrangements H01J 7/30); Auxiliary electrodes (auxiliary anodes for maintaining a discharge H01J 1/36)

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Auxiliary anodes for maintaining a discharge | H01J 1/36 |
| Electrodes for igniting arrangements          | H01J 7/30 |

H01J 1/52
Screens for shielding (screens acting as control electrodes H01J 1/46); Guides for influencing the discharge; Masks interposed in the electron stream

References
Limiting references
This place does not cover:

| Screens acting as control electrodes          | H01J 1/46 |

H01J 1/90
Insulation between electrodes or supports within the vacuum space (leading-in conductors H01J 5/46)

References
Limiting references
This place does not cover:

| Leading-in conductors                        | H01J 5/46 |

H01J 1/94
Mountings for individual electrodes (for directly-heated cathodes H01J 1/15)

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Mountings for directly-heated cathodes      | H01J 1/15 |
**H01J 3/00**

**Details of electron-optical or ion-optical arrangements or of ion traps common to two or more basic types of discharge tubes or lamps**

**Definition statement**

*This place covers:*

Details of electron-optical or ion-optical arrangements or of ion traps of an unspecified kind of discharge tube or discharge lamp, or of two or more kinds of discharge tubes or discharge lamps as defined by groups H01J 11/00, H01J 13/00, H01J 15/00, H01J 17/00, H01J 21/00, H01J 25/00, H01J 27/00, H01J 31/00, H01J 33/00, H01J 35/00, H01J 37/00, H01J 40/00, H01J 41/00, H01J 43/00, H01J 45/00, H01J 47/00, H01J 49/00, H01J 61/00, H01J 63/00 or H01J 65/00, hereinafter called basic kinds, wherein plasma display panels of H01J 11/00, H01J 17/00, electron emission display panels of H01J 31/00 and flat panel electron emission lamps as LCD backlight of H01J 63/00 are considered as a single basic kind.

In particular: Electron/ion guns of an unspecified electron/ion beam tube and control electrode structures of a field emission device.

**References**

**Limiting references**

*This place does not cover:*

| Details only described with reference to or clearly only applicable to discharge tubes or discharge lamps of a single basic kind | H01J 11/00, H01J 13/00, H01J 15/00, H01J 17/00, H01J 21/00, H01J 25/00, H01J 27/00, H01J 31/00, H01J 33/00, H01J 35/00, H01J 37/00, H01J 40/00, H01J 41/00, H01J 43/00, H01J 45/00, H01J 47/00, H01J 49/00, H01J 61/00, H01J 63/00 or H01J 65/00 |

**Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

| Apparatus or processes specially adapted for the manufacture of details of H01J 3/00 | H01J 9/00 |
| Ion guns of ion beam tubes | H01J 27/02 |
| Electron guns of cathode ray tubes and electron beam tubes - discharge tubes with provision for introducing objects or material to be exposed to the discharge | H01J 29/48, H01J 37/06 |
| Arrangements for handling radiation or particles, e.g. focusing, moderating | G21K 1/00 |
| Circuit arrangements for producing sawtooth pulses or other deflecting voltages or currents | H03K |
| Particle accelerators | H05H 3/00 - H05H 15/00 |

**Special rules of classification**

- Details are additionally classified using the relevant Indexing Codes of H01J 2203/00.
• Control electrode structures of field emission devices (i.e. structures where the form/structure, material or relative arrangement of the gate electrode(s) or the focusing electrode(s) is the relevant detail) are classified in H01J 3/021-H01J 3/022 and, where applicable, H01J 2203/0204-H01J 2203/0292 (i.e. under "electron guns"). If only the cathode structure or material is the relevant detail, classification is provided in H01J 1/30-H01J 1/316 and, where applicable, H01J 2201/30-H01J 2201/317.
• If the control structures of a general field emission device and of a field emission display or a flat panel electron emission lamp (as LCD backlight) is disclosed, classification is provided in H01J 3/021-H01J 3/022 and H01J 29/467, H01J 29/481, H01J 2329/4604-H01J 2329/4695, H01J 31/127 or H01J 63/00.

Synonyms and Keywords
In patent documents, the following abbreviations are often used:

| FED | field emission device / display |

### H01J 3/02

Electron guns {(electron guns for discharge tubes with provision for introducing objects or material to be exposed to the discharge H01J 37/06; for cathode ray tubes H01J 29/48)}

References

Informative references
Attention is drawn to the following places, which may be of interest for search:

| Electron guns for cathode ray tubes | H01J 29/48 |
| Electron guns for discharge tubes with provision for introducing objects or material to be exposed to the discharge | H01J 37/06 |

### H01J 3/06

two or more guns being arranged in a single vacuum space, e.g. for plural-ray tubes (H01J 3/07 takes precedence (see provisionally also H01J 29/46 - H01J 29/84))

References

Limiting references
This place does not cover:

| Arrangements for controlling convergence of a plurality of beams | H01J 3/07 |
H01J 3/08

Arrangements for controlling intensity of ray or beam (H01J 3/02, H01J 3/04 take precedence {see provisionally also H01J 29/46 - H01J 29/84})

References

Limiting references
This place does not cover:

<table>
<thead>
<tr>
<th>Electron guns</th>
<th>H01J 3/02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ion guns</td>
<td>H01J 3/04</td>
</tr>
</tbody>
</table>

H01J 3/10

Arrangements for centering ray or beam (H01J 3/02, H01J 3/04 take precedence {see provisionally also H01J 29/46 - H01J 29/84})

References

Limiting references
This place does not cover:

<table>
<thead>
<tr>
<th>Electron guns</th>
<th>H01J 3/02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ion guns</td>
<td>H01J 3/04</td>
</tr>
</tbody>
</table>

H01J 3/12

Arrangements for controlling cross-section of ray or beam; Arrangements for correcting aberration of beam, e.g. due to lenses (H01J 3/02, H01J 3/04 take precedence {see provisionally also H01J 29/46 - H01J 29/84})

References

Limiting references
This place does not cover:

<table>
<thead>
<tr>
<th>Electron guns</th>
<th>H01J 3/02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ion guns</td>
<td>H01J 3/04</td>
</tr>
</tbody>
</table>

H01J 3/14

Arrangements for focusing or reflecting ray or beam (H01J 3/02, H01J 3/04 take precedence {see provisionally also H01J 29/46 - H01J 29/84})

References

Limiting references
This place does not cover:

<table>
<thead>
<tr>
<th>Electron guns</th>
<th>H01J 3/02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ion guns</td>
<td>H01J 3/04</td>
</tr>
</tbody>
</table>
H01J 3/26

Arrangements for deflecting ray or beam (circuit arrangements for producing saw-tooth pulses or other deflecting voltages or currents H03K; \{H01J 29/46 - H01J 29/84 and H01J 37/147 take precedence\})

References

Limiting references

This place does not cover:

| Details relating to vessels or to leading-in conductors common to two or more basic types of discharge tubes or lamps | H01J 11/00, H01J 13/00, H01J 15/00, H01J 17/00, H01J 21/00, H01J 25/00, H01J 27/00, H01J 31/00, H01J 33/00, H01J 35/00, H01J 37/00, H01J 40/00, H01J 41/00, H01J 43/00, H01J 45/00, H01J 47/00, H01J 49/00, H01J 61/00, H01J 63/00, H01J 65/00 | H01J 11/00, H01J 13/00, H01J 15/00, H01J 17/00, H01J 21/00, H01J 25/00, H01J 27/00, H01J 31/00, H01J 33/00, H01J 35/00, H01J 37/00, H01J 40/00, H01J 41/00, H01J 43/00, H01J 45/00, H01J 47/00, H01J 49/00, H01J 61/00, H01J 63/00, H01J 65/00 |

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Details relating to vessels or to leading-in conductors common to two or more basic types of discharge tubes or lamps | H01J 11/00, H01J 13/00, H01J 15/00, H01J 17/00, H01J 21/00, H01J 25/00, H01J 27/00, H01J 31/00, H01J 33/00, H01J 35/00, H01J 37/00, H01J 40/00, H01J 41/00, H01J 43/00, H01J 45/00, H01J 47/00, H01J 49/00, H01J 61/00, H01J 63/00, H01J 65/00, H03K | H01J 11/00, H01J 13/00, H01J 15/00, H01J 17/00, H01J 21/00, H01J 25/00, H01J 27/00, H01J 31/00, H01J 33/00, H01J 35/00, H01J 37/00, H01J 40/00, H01J 41/00, H01J 43/00, H01J 45/00, H01J 47/00, H01J 49/00, H01J 61/00, H01J 63/00, H01J 65/00 |

H01J 5/00

Details relating to vessels or to leading-in conductors common to two or more basic types of discharge tubes or lamps

Definition statement

This place covers:

Details relating to vessels or to leading-in conductors of an unspecified kind of discharge tube or discharge lamp, or of two or more kinds of discharge tubes or discharge lamps as defined by groups H01J 11/00, H01J 13/00, H01J 15/00, H01J 17/00, H01J 21/00, H01J 25/00, H01J 27/00, H01J 31/00, H01J 33/00, H01J 35/00, H01J 37/00, H01J 40/00, H01J 41/00, H01J 43/00, H01J 45/00, H01J 47/00, H01J 49/00, H01J 61/00, H01J 63/00, H01J 65/00, hereinafter called basic kinds, wherein plasma display panels of H01J 11/00, H01J 17/00, electron emission display panels of H01J 31/00 and flat panel electron emission lamps as LCD backlight of H01J 63/00 are considered as a single basic kind.

References

Limiting references

This place does not cover:

| Details only described with reference to or clearly only applicable to discharge tubes or discharge lamps of a single basic kind | H01J 11/00, H01J 13/00, H01J 15/00, H01J 17/00, H01J 21/00, H01J 25/00, H01J 27/00, H01J 31/00, H01J 33/00, H01J 35/00, H01J 37/00, H01J 40/00, H01J 41/00, H01J 43/00, H01J 45/00, H01J 47/00, H01J 49/00, H01J 61/00, H01J 63/00, H01J 65/00 | H01J 11/00, H01J 13/00, H01J 15/00, H01J 17/00, H01J 21/00, H01J 25/00, H01J 27/00, H01J 31/00, H01J 33/00, H01J 35/00, H01J 37/00, H01J 40/00, H01J 41/00, H01J 43/00, H01J 45/00, H01J 47/00, H01J 49/00, H01J 61/00, H01J 63/00, H01J 65/00 |
Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Apparatus or processes specially adapted for the manufacture of details of H01J 5/00</th>
<th>H01J 9/00</th>
</tr>
</thead>
</table>

Vessels

<table>
<thead>
<tr>
<th>Soldering; welding; working by laser beam</th>
<th>B23K, B23K 26/00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laminating glass layers</td>
<td>B32C17/10</td>
</tr>
<tr>
<td>Reforming and uniting glass sheets by fusing</td>
<td>C03B 23/00</td>
</tr>
<tr>
<td>Glass compositions</td>
<td>C03C 3/00 - C03C 4/00</td>
</tr>
<tr>
<td>Fusion frit compositions</td>
<td>C03C 8/24</td>
</tr>
<tr>
<td>Glass ceramics</td>
<td>C03C 10/00</td>
</tr>
<tr>
<td>Surface treatment of glass ... by coating (e.g. with dielectric materials)</td>
<td>C03C 15/00 - C03C 25/00, C03C 17/00</td>
</tr>
<tr>
<td>Joining glass to glass other than by fusing; Joining pieces of glass to pieces of other inorganic material</td>
<td>C03C 27/00</td>
</tr>
<tr>
<td>Ceramics</td>
<td>C04B 35/00</td>
</tr>
<tr>
<td>Coating (e.g. of metal or dielectric materials)... by vacuum evaporation, by sputtering or by ion implantation</td>
<td>C23C, C23C 14/00</td>
</tr>
<tr>
<td>Units comprising two or more parallel glass of like panes permanently secured together</td>
<td>E06B23/00</td>
</tr>
</tbody>
</table>

Connecting or feeding means

| Electric coupling devices comprising a holder adapted for supporting a tube or lamp and not forming part of the tube or lamp | H01J 33/00 |

H01J 5/04

Vessels or containers characterised by the material thereof (selection of the material of the coating H01J 5/08)

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Selection of the material of the coating | H01J 5/08 |
H01J 5/08
provided with coatings on the walls thereof; Selection of materials for the coatings (luminescent coatings H01J 1/62)

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Luminescent coatings | H01J 1/62 |

H01J 5/16
Optical or photographic arrangements structurally combined with the vessel (luminescent coatings H01J 1/62 (see provisionally H01J 29/84))

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Luminescent coatings | H01J 1/62 |

H01J 5/34
for an individual conductor (pinched-stem seals H01J 5/38; end-disc seals H01J 5/40; annular seals H01J 5/44)

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Pinched-stem seals | H01J 5/38 |
| End-disc seals | H01J 5/40 |
| Annular seals | H01J 5/44 |

H01J 5/48
Means forming part of the tube or lamp for the purpose of supporting it (associated with electrical connecting means H01J 5/50)

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Electrical connecting means | H01J 5/50 |
H01J 7/00
Details not provided for in the preceding groups and common to two or more basic types of discharge tubes or lamps

Definition statement
This place covers:
Details not provided for in the preceding groups of an unspecified kind of discharge tube or discharge lamp, or of two or more kinds of discharge tubes or discharge lamps as defined by groups H01J 11/00, H01J 13/00, H01J 15/00, H01J 17/00, H01J 21/00, H01J 25/00, H01J 27/00, H01J 31/00, H01J 33/00, H01J 35/00, H01J 37/00, H01J 40/00, H01J 41/00, H01J 43/00, H01J 45/00, H01J 47/00, H01J 49/00, H01J 61/00, H01J 63/00 or H01J 65/00, hereinafter called basic kinds, wherein plasma display panels of H01J 11/00, H01J 17/00, electron emission display panels of H01J 31/00 and flat panel electron emission lamps as LCD backlight of H01J 63/00 are considered as a single basic kind.

In particular: Selection of substances for gas fillings and specified operating pressure or temperature; means for obtaining or maintaining the desired pressure within the vessel; cooling arrangements, heating arrangements and means for circulating gas or vapour within the discharge space; ignition arrangements

References
Limiting references
This place does not cover:
Details only described with reference to or clearly only applicable to discharge tubes or discharge lamps of a single basic kind

| H01J 11/00, H01J 13/00, H01J 15/00, H01J 17/00, H01J 21/00, H01J 25/00, H01J 27/00, H01J 31/00, H01J 33/00, H01J 35/00, H01J 37/00, H01J 40/00, H01J 41/00, H01J 43/00, H01J 45/00, H01J 47/00, H01J 49/00, H01J 61/00, H01J 63/00, H01J 65/00 |

Informative references
Attention is drawn to the following places, which may be of interest for search:

| Apparatus or processes specially adapted for the manufacture of details of H01J 7/00 | H01J 9/00 |
| Control or maintenance of pressure in the vessel or discharge tubes or lamps | H01J 9/385, H01J 2209/385 - H01J 2209/3855 |
| Getters in AC plasma display panels | H01J 11/52 |
| Getters in DC plasma display panels | H01J 17/24 |
| Getters in cathode ray tubes and electron beam tubes | H01J 29/94 |
| Circuit arrangements for igniting | H02M 1/02, H05B |
Synonyms and Keywords

In patent documents, the following abbreviations are often used:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEG</td>
<td>non-evaporable getter</td>
</tr>
</tbody>
</table>

H01J 7/02

Selection of substances for gas fillings; Specified operating pressure or temperature (radioactive fillings H01J 7/40)

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Description</th>
<th>Class Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radioactive fillings</td>
<td>H01J 7/40</td>
</tr>
</tbody>
</table>

H01J 7/24

Cooling arrangements (for main electrodes H01J 1/02); Heating arrangements (for main electrodes H01J 1/02); Means for circulating gas or vapour within the discharge space

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Description</th>
<th>Class Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling arrangements for main electrodes</td>
<td>H01J 1/02</td>
</tr>
<tr>
<td>Heating arrangements for main electrodes</td>
<td>H01J 1/02</td>
</tr>
</tbody>
</table>

H01J 7/30

Igniting arrangements (circuit arrangements H02M 1/02, H05B)

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Description</th>
<th>Class Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuit arrangements</td>
<td>H02M 1/02, H05B</td>
</tr>
</tbody>
</table>
H01J 9/00

Apparatus or processes specially adapted for the manufacture, {installation, removal, maintenance} of electric discharge tubes, discharge lamps, or parts thereof (manufacture of vessels or containers from metal B21, e.g. B21D 51/00, from glass C03B); Recovery of material from discharge tubes or lamps

Definition statement

This place covers:
Apparatus or processes specially adapted to the manufacture, of electric discharge tubes and discharge lamps of H01J, or parts thereof; Repairing or regenerating used or defective discharge tubes or discharge lamps of H01J; Recovery of material from discharge tubes or discharge lamps of H01J

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Electrodes and electron emitters

| Microstructural technology | B81B, B81C |
| Nanostructures and manufacture or treatment thereof | B82B |
| Carbon and compounds thereof; manufacture thereof CNT material and manufacture thereof | C01B 32/00, C01B 32/158 |
| Metal coating of glasses | C03C 17/06 |
| Multilayer metal coating of glasses | C03C 17/36 |
| PZT (lead zirconate titanate) emitter materials and manufacture thereof | C04B 35/493 |
| Metallurgy | C21, C22 |
| Metal alloys | C22C |
| Coating (e.g. of metal or dielectric materials) | C23C |
| Deposition of carbon by e.g. chemical vapour deposition | C23C 16/26 |
| Electrolytic or electrophoretic production of coatingse.g. of CNT and carbon fibres on a substrate | C25D, C25D 15/00 |
| Photolithographic production of patterned surfaces; photosensitive materials therefor | G03F 7/00 |

Luminescent screens

| Luminescent materials or compositions | C09K 11/00 |
| Luminescent screens for X-ray purposes | G21K 4/00 |

Deflecting devices

| Manufacturing coils for transformers, inductances, reactors or choke coils | H01F 41/04 |
### Vessels

<table>
<thead>
<tr>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleaning devices or components</td>
</tr>
<tr>
<td>Manufacture of vessels or containers from metal</td>
</tr>
<tr>
<td>Soldering; welding; working by laser beam</td>
</tr>
<tr>
<td>Moulds</td>
</tr>
<tr>
<td>Layered products characterised by the relation between layers, e.g. by using adhesives</td>
</tr>
<tr>
<td>Laminating glass layers</td>
</tr>
<tr>
<td>Manufacture of vessels or containers from glass</td>
</tr>
<tr>
<td>Reforming and uniting glass sheets by fusing</td>
</tr>
<tr>
<td>Fusion frit compositions</td>
</tr>
<tr>
<td>Surface treatment of glass by coating (e.g. with dielectric materials)</td>
</tr>
<tr>
<td>Joining glass to glass other than by fusing; Joining pieces of glass to pieces of other inorganic material</td>
</tr>
<tr>
<td>Adhesives</td>
</tr>
<tr>
<td>Coating (e.g. of metal or dielectric materials) by vacuum evaporation, by sputtering or by ion implantation by chemical vapour deposition</td>
</tr>
<tr>
<td>Coatings on or surface treatment of optical elements</td>
</tr>
</tbody>
</table>

### Classification is made in **H01J 9/00** and additionally in **H01J 2209/00**.

### Special rules of classification

As to plasma display panels and electron emission display/flat panels:

- Apparatus or processes specially adapted to the manufacture of electrodes, dielectric layers or protection layers of plasma display panels are covered by **H01J 9/02** (since being part of the manufacture of the electrode system). Apparatus or processes specially adapted to the manufacture of control electrodes (gate electrodes, focusing electrodes) of electron emission flat panels are covered by **H01J 9/148**. Apparatus or processes specially adapted to the manufacture of anode electrodes of electron emission flat panels are covered by **H01J 9/148** if merely the anode electrode(s) is(are) concerned. The arrangement of luminescent material, the reflective layers or the black matrix is rather covered by **H01J 9/227** and subgroups thereof. The manufacture of field emitters, like carbon nanotube emitters, is covered by **H01J 9/025**, the manufacture of CNT materials in general by **C01B 32/158**.
- Methods of assembling together the component parts of electrode systems of the display panels are covered by **H01J 9/185**.

Apparatus or processes specially adapted for applying optical layers / coatings or shielding layers / coatings (e.g. filter layers, electromagnetic interference shielding layers, anti-reflection coatings, anti-glare coatings) integral with or directly attached to the display panel, e.g. to the front substrate, are covered by **H01J 9/205**. Apparatus or processes for applying luminescent material/coatings to the screen or vessel are covered by **H01J 9/227** and subgroups thereof. **H01J 9/2278** covers the application of light absorbing material (black matrix), e.g. between the luminescent material.

- Apparatus or processes specially adapted to the manufacture of the vessel of the display panels are covered by **H01J 9/241** (regarding faceplate (front substrate); backplate (rear substrate); frame
between the plates), H01J 9/242 (regarding spacers / barrier ribs between the faceplate and the backplate) or H01J 9/261 (regarding sealing together parts of the vessel).

- Apparatus or processes specially adapted to the manufacture of leading-in conductors are covered by H01J 9/28 and those adapted to the sealing of leading-in conductors are covered by H01J 9/32.
- Apparatus or processes specially adapted to exhausting, degassing, filling, or cleaning the vessels are covered by H01J 9/38 (or subgroups thereof), those adapted to the closing of the vessels are covered by H01J 9/40.
- Further, the subgroups H01J 9/42 (measuring or testing during manufacture), H01J 9/44, H01J 9/445 (factory adjustment), H01J 9/46, H01J 9/48 (machines having sequentially arranged operating stations), H01J 9/50, H01J 9/505 (repairing or regenerating), H01J 9/52 (recovery of material) also cover plasma display panels and electron emission display panels.

**H01J 9/233**

Manufacture of photoelectric screens or charge-storage screens {(no documents, see H01J 29/36)}

Special rules of classification

This group is not used, the subject matter is covered by H01J 29/36

**H01J 9/236**

Manufacture of magnetic deflecting devices for cathode-ray tubes (manufacturing coils for transformers, inductances, reactors or choke coils H01F 41/04)

References

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

Manufacturing coils for transformers, inductances, reactors or choke coils H01F 41/04

**H01J 9/52**

Recovery of material from discharge tubes or lamps (H01J 9/50 takes precedence)

References

*Limiting references*

This place does not cover:

Repairing or regenerating used or defective discharge tubes or lamps H01J 9/50
H01J 11/00
Gas-filled discharge tubes with alternating current induction of the discharge, e.g. AC-PDPs [Alternating Current Plasma Display Panels] (circuits or methods for driving PDPs G09G 3/28); Gas-filled discharge tubes without any main electrode inside the vessel; Gas-filled discharge tubes with at least one main electrode outside the vessel (discharge lamps H01J 65/00 {H01J 61/00, H01J 63/00})

Definition statement
This place covers:
• Plasma display panels having alternating current induction of the discharge as well as gas-filled discharge tubes with at least one main electrode outside the vessel. The main electrode is out of contact with the plasma.
• Arrangements for plasma display panels such as cables, wiring, heat dissipating bodies, electromagnetic shielding arrangements that are inside the vessel, or partly inside the vessel, or directly attached to the vessel.

References
Limiting references
This place does not cover:

| Methods for manufacturing AC-PDPs | H01J 9/00 |
| Discharge lamps | H01J 61/00, H01J 63/00, H01J 65/00 |
| Circuits or methods for driving AC-PDPs | G09G 3/28 |

Informative references
Attention is drawn to the following places, which may be of interest for search:

| Plasma addressed liquid crystal devices [PALC] | H01J 17/485, G02F 1/13334 |
| Direct current plasma display panels [DC-PDP] | H01J 17/49, 7/00 |
| Cathode ray tubes [CRT] | H01J 29/00, H01J 31/00 |
| Field emission displays [FED] | H01J 29/00, H01J 31/00 |
| Cooling arrangements being part of the tube, e.g. an heat dissipation sheet directly attached to the vessel | H01J 2211/66 |
| Liquid crystal displays [LCD] | G02F 1/13 |
| Electrophoretic displays | G02F 1/167 |
| Touch screens | G06F 3/00 |
| Indicating arrangements for variable information in which the information is built-up on a support by selection or combination of individual elements | G09F 9/00 |
| Displays using organic light-emitting diodes | H01L 27/32 |
| Light emitting diodes [LED] | H01L 33/00 |
| Organic light-emitting diodes [OLED] | H01L 51/50 |
| Casings, cabinets or drawers for electric apparatus | H05K 5/00 |
| Constructional details common to different types of electric apparatus | H05K 7/00 |
Modifications to facilitate cooling, ventilating, or heating in electrical apparatus

Electromagnetic shielding

Special rules of classification

When classifying in this main group, classification is made in any appropriate place, i.e. multi-aspect classification is used. This means that, e.g., a document relating to a dielectric layer of an AC-PDP is classified in one of H01J10/00 - H01J18/00 (identifying the kind of structure of the PDP) and in H01J 11/38 (relating to dielectric and insulating layers).

In this main group documents are classified according to the reformed ECLA approach, i.e. important (invention-type) information is identified with ECLA symbols, e.g. H01J 11/12, additional (secondary) information with Indexing Code symbols, e.g. H01J 2211/12.

Classification of important information and additional information is obligatory in this main group.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

| Main electrode | sustain electrode, address electrode or scan electrode |

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

<table>
<thead>
<tr>
<th>AC</th>
<th>DC</th>
<th>PDP</th>
<th>EMI</th>
<th>NIR</th>
<th>IR</th>
<th>PALC</th>
</tr>
</thead>
</table>

H01J 11/10

AC-PDPs with at least one main electrode being out of contact with the plasma

Definition statement

This place covers:
The kind of structure of the AC plasma display panel.
**H01J 11/22**

**Electrodes, e.g. special shape, material or configuration**

**References**

**Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

<table>
<thead>
<tr>
<th>Working metallic powder</th>
<th>B22F 1/00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multilayer coating of glasses with metal</td>
<td>C03C 17/36</td>
</tr>
<tr>
<td>Joining glass to metal</td>
<td>C03C 27/00</td>
</tr>
<tr>
<td>Coating on polymers</td>
<td>C08J 7/00</td>
</tr>
<tr>
<td>Photolithographic production of patterned surfaces; photosensitive materials</td>
<td>G03F 7/00</td>
</tr>
<tr>
<td>Composition of metallic electrodes</td>
<td>H01B 1/00</td>
</tr>
</tbody>
</table>

**Synonyms and Keywords**

*In patent documents, the following words/expressions are often used as synonyms:*

- "discharge electrodes", "maintenance electrodes", "scan and sustain electrodes" and "display electrodes"
- "address electrodes", "write electrodes", "column electrodes" and "data electrodes".

**H01J 11/34**

**Vessels, containers or parts thereof, e.g. substrates**

**Definition statement**

*This place covers:*

Vessels, containers or parts thereof, substrates for plasma displays, alignment marks on the substrate.

**References**

**Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

<table>
<thead>
<tr>
<th>Shaping of glass</th>
<th>C03B 9/00 - C03B 33/00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass compositions (flat glass, powders or frit, devitrified glass, fibres, etc.)</td>
<td>C03C 1/00 - C03C 14/00</td>
</tr>
<tr>
<td>Glass compositions</td>
<td>C03C 3/00</td>
</tr>
<tr>
<td>Frits</td>
<td>C03C 8/00</td>
</tr>
<tr>
<td>Glass ceramics</td>
<td>C03C 10/00</td>
</tr>
<tr>
<td>Powdered glass</td>
<td>C03C 12/00</td>
</tr>
<tr>
<td>Glass composition containing a non glass component</td>
<td>C03C 14/00</td>
</tr>
<tr>
<td>Ceramics</td>
<td>C04B 35/00</td>
</tr>
</tbody>
</table>
H01J 11/36
Spacers, barriers, ribs, partitions or the like

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Glass compositions (flat glass, powders or frit, devitrified glass, fibres, etc.) | C03C 1/00 - C03C 14/00 |
| Glass compositions | C03C 3/00 |
| Ceramics | C04B 35/00 |

Special rules of classification
Further details are covered by the subgroups of Indexing Code groups listed below. Classification is obligatory.

| H01J 2211/363 | Cross section of the spacers |
| H01J 2211/365 | Pattern of the spacers |
| H01J 2211/368 | Dummy spacers |

H01J 11/38
Dielectric or insulating layers

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Layered products comprising glass | B32B 17/00 |
| Glass compositions (flat glass, powders or frit, devitrified glass, fibres, etc.) | C03C 1/00 - C03C 14/00 |
| Glass compositions | C03C 3/00 |
| Glass ceramics | C03C 10/00 |
| Surface treatment of glass (e.g. coating, etching, ion exchange, etc.) | C03C 15/00 - C03C 25/00 |
| Ceramics | C04B 35/00 |
| Insulating bodies characterized by the material | H01B 3/00 |
H01J 11/40
Layers for protecting or enhancing the electron emission, e.g. MgO layers

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Layered products comprising glass</th>
<th>B32B 17/00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass compositions (flat glass, powders or frit, devitrified glass, fibres, etc.)</td>
<td>C03C 1/00 - C03C 14/00</td>
</tr>
<tr>
<td>Glass compositions</td>
<td>C03C 3/00</td>
</tr>
<tr>
<td>Glass ceramics</td>
<td>C03C 10/00</td>
</tr>
<tr>
<td>Surface treatment of glass (e.g. coating, etching, ion exchange, etc.)</td>
<td>C03C 15/00 - C03C 25/00</td>
</tr>
<tr>
<td>Ceramics</td>
<td>C04B 35/00</td>
</tr>
</tbody>
</table>

H01J 11/42
Fluorescent layers

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Fluorescent materials per se | C09K 11/00 |

Special rules of classification
Regarding fluorescent materials: in order to be classified in H01J 11/42, the invention has to refer to an AC plasma display panel, wherein the phosphor is composed of a particular material.

H01J 11/44
Optical arrangements or shielding arrangements, e.g. filters, black matrices, light reflecting means or electromagnetic shielding means

Definition statement
This place covers:
Optical arrangements or shielding arrangements. Also means to improve contrast.

For example, a document regarding an arrangement to improve contrast, like adding pigments of different colours in ribs, dielectric layer and substrate, is covered by H01J 11/44. Filters for AC-PDPs are covered by H01J 11/44 if they are inside or directly attached to the vessel.

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Layered products comprising glass | B32B 17/00 |

23
Layered products comprising resin
Materials of adhesive layers
Optical elements characterized by the material
Optical elements other than lenses
Production of optical devices by litographic processes; photosensitive materials
Electromagnetic shielding

Special rules of classification

Further details are covered by the subgroups of Indexing Code groups listed below. Classification is obligatory.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>H01J 2211/442</td>
<td>Light reflecting means; Anti-reflection means</td>
</tr>
<tr>
<td>H01J 2211/444</td>
<td>Means for improving contrast or colour purity, e.g. black matrix or light shielding means</td>
</tr>
<tr>
<td>H01J 2211/446</td>
<td>Electromagnetic shielding means; Antistatic means</td>
</tr>
<tr>
<td>H01J 2211/448</td>
<td>Near infrared shielding means</td>
</tr>
</tbody>
</table>

H01J 11/46

Connecting or feeding means, e.g. leading-in conductors

Definition statement

This place covers:
Means for giving electricity to the electrodes of the AC-PDP. Such means are classified here only if at least part of said means is inside the vessel.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>G09G 3/28</td>
<td>Driving circuits</td>
</tr>
<tr>
<td>H01R/00</td>
<td>Connectors</td>
</tr>
<tr>
<td>H05K 1/00</td>
<td>Printed circuits</td>
</tr>
<tr>
<td>H05K 3/36</td>
<td>Assembling printed circuits with other printed circuits</td>
</tr>
<tr>
<td>H05K 5/00</td>
<td>Casings, cabinets or drawers for electric apparatus</td>
</tr>
<tr>
<td>H05K 7/00</td>
<td>Constructional details common to different types of electric apparatus</td>
</tr>
</tbody>
</table>
**H01J 11/48**

Sealing, e.g. seals specially adapted for leading-in conductors

**References**

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

| Composition of fusing seals | C03C 8/24 |

**H01J 11/54**

Means for exhausting the gas

**Definition statement**

This place covers:

Means for exhausting the gas, e.g. vent pipes or ribs arrangements for exhausting the gas

**References**

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

| Methods of exhausting vessels | H01J 9/385 |

**H01J 13/00**

Discharge tubes with liquid-pool cathodes, e.g. metal-vapour rectifying tubes (lamps H01J 61/00)

**Definition statement**

This place covers:

Gas filled discharge tubes with liquid pool cathodes. Metal-vapour rectifier. In particular, mercury-vapour rectifier for converting high-voltage or high-current alternating current into direct current.

**References**

*Limiting references*

This place does not cover:

| Discharge lamps | H01J 61/00 |

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

| Circuit arrangements for discharge tubes in static converters | H02M 1/02 |
H01J 13/16
Anodes; Auxiliary anodes for maintaining the discharge (screens H01J 13/22)

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Screens     | H01J 13/22 |

H01J 13/20
Control electrodes, e.g. grid (for igniting arrangements H01J 13/34)

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Control electrodes for igniting arrangements | H01J 13/34 |

H01J 13/32
Cooling arrangements; Heating arrangements (for cathodes H01J 13/14; for anodes H01J 13/18)

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Cooling arrangements for cathodes | H01J 13/14 |
| Cooling arrangements for anodes   | H01J 13/18 |

H01J 13/34
Igniting arrangements (circuits arrangements H02M 1/02)

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Circuits arrangements                     | H02M 1/02 |
H01J 13/44
Devices for preventing or eliminating arcing-back (screens therefor H01J 13/22)

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Screens therefor | H01J 13/22 |

H01J 15/00
Gas-filled discharge tubes with gaseous cathodes, e.g. plasma cathode (lamps H01J 61/62)

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Lamps | H01J 61/62 |

H01J 17/00
Gas-filled discharge tubes with solid cathode (H01J 25/00, H01J 27/00, H01J 31/00 - H01J 41/00 {H01J 11/00} take precedence; gas or vapour discharge lamps H01J 61/00; gas filled spark gaps H01T; Marx converters H02M 7/26; tubes for generating potential differences by charges carried in a gas stream H02N)

Definition statement
This place covers:
Gas filled discharge tubes with solid cathode. Plasma display panels operated with direct current (DC PDPs) and their details. Plasma addressed liquid crystal displays (PALC). Thyratrons.

References
Limiting references
This place does not cover:

| Gas-filled discharge tubes with alternating current induction of the discharge, e.g. AC-PDPs | H01J 11/00 |
| Transit-time tubes, e.g. Klystrons, travelling wave tubes, magnetrons | H01J 25/00 |
| Ion beam tubes | H01J 27/00 |
| Cathode ray tubes and electron beam tubes, in particular electron emission (e.g. field emission) display panels | H01J 31/00 |
| Discharge tubes for measuring pressure of introduced gas or for evacuation by diffusion of ions | H01J 41/00 |
| Discharge lamps | H01J 61/00 |
| Spark gaps, including gas-filled spark gaps | H01T |
Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Reference Category</th>
<th>Classification(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plasma addressed liquid crystal devices [PALC]</td>
<td>H01J 17/485, G02F 1/13334</td>
</tr>
<tr>
<td>Direct current plasma display panels [DC-PDP]</td>
<td>H01J 17/49</td>
</tr>
<tr>
<td>Cathode ray tubes [CRT]</td>
<td>H01J 29/00, H01J 31/00</td>
</tr>
<tr>
<td>Field emission displays [FED]</td>
<td>H01J 29/00, H01J 31/00</td>
</tr>
<tr>
<td>Liquid crystal displays [LCD]</td>
<td>G02F 1/13</td>
</tr>
<tr>
<td>Electrophoretic displays</td>
<td>G02F 1/167</td>
</tr>
<tr>
<td>Touch screens</td>
<td>G06F 3/00</td>
</tr>
<tr>
<td>Indicating arrangements for variable information in which the information is built-up on a support by selection or combination of individual elements</td>
<td>G09F 9/00</td>
</tr>
<tr>
<td>Displays using organic light-emitting diodes</td>
<td>H01L 27/32</td>
</tr>
<tr>
<td>Light emitting diodes [LED]</td>
<td>H01L 33/00</td>
</tr>
<tr>
<td>Organic light-emitting diodes [OLED]</td>
<td>H01L 51/50</td>
</tr>
</tbody>
</table>

Special rules of classification

When classifying in this main group, classification is made in any appropriate place, i.e. multi-aspect classification is used. This means that, e.g., a document relating to an anode of a PALC should be classified in H01J 17/485 (relating to the PALC) and H01J 17/10 (relating to the anode).

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC</td>
<td>Direct Current</td>
</tr>
<tr>
<td>PDP</td>
<td>Plasma Display Panel</td>
</tr>
<tr>
<td>PALC</td>
<td>Plasma Addressed Liquid Crystals</td>
</tr>
</tbody>
</table>

H01J 17/20

Selection of substances for gas fillings; Specified operating pressures or temperature (radioactive fillings H01J 17/32)

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Reference Category</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radioactive fillings</td>
<td>H01J 17/32</td>
</tr>
</tbody>
</table>
H01J 17/38
Cold-cathode tubes (TR boxes H01J 17/64)

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| TR boxes | H01J 17/64 |

H01J 17/40
with one cathode and one anode, e.g. glow tubes, tuning-indicator glow tubes, voltage-stabiliser tubes, voltage-indicator tubes, (cathode-glow lamps H01J 61/04)

References
Limiting references
This place does not cover:

| Cathode-glow lamps | H01J 61/04 |

H01J 17/49
Display panels, e.g. with crossed electrodes {, e.g. making use of direct current} (gas discharge type indicating arrangements effected by the combination of a number of individual lamps G09F 9/313 {display panels making use of alternating current H01J 11/00})

References
Limiting references
This place does not cover:

| Display panels making use of alternating current | H01J 11/00 |
| Gas discharge type indicating arrangements effected by the combination of a number of individual lamps | G09F 9/313 |

H01J 17/50
Thermionic-cathode tubes (TR boxes H01J 17/64)

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| TR boxes | H01J 17/64 |
H01J 19/00
Details of vacuum tubes of the types covered by group H01J 21/00

Definition statement
This place covers:
Details of tubes in which the electron stream is not altered in other ways than on/off.

H01J 19/16
Heaters (filaments for incandescent lamps H01K 1/02)

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Filaments for incandescent lamps</th>
<th>H01K 1/02</th>
</tr>
</thead>
</table>

H01J 19/40
Screens for shielding (screens acting as control electrodes H01J 19/38)

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Screens acting as control electrodes</th>
<th>H01J 19/38</th>
</tr>
</thead>
</table>

H01J 19/44
Insulation between electrodes or supports within the vacuum space (leading-in conductors H01J 19/62)

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Leading-in conductors</th>
<th>H01J 19/62</th>
</tr>
</thead>
</table>

H01J 19/48
Mountings for individual electrodes (for directly-heated cathodes H01J 19/12)

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Mountings for directly-heated cathodes</th>
<th>H01J 19/12</th>
</tr>
</thead>
</table>
H01J 19/64
Means forming part of the tube for the purpose supporting it (associated with electrical connecting means H01J 19/66)

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Means associated with electrical connecting means | H01J 19/66 |

H01J 19/66
Means forming part of the tube for the purpose of providing electrical connection to it (construction of connectors H01R {no documents, see H01J 5/46 - H01J 5/62})

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Construction of connectors | H01R |

Special rules of classification
This group is not used for classification, the subject matter is covered by H01J 5/46 - H01J 5/62.

H01J 19/74
Cooling arrangements (cooling of anodes H01J 19/36)

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Cooling of anodes | H01J 19/36 |

H01J 21/00
Vacuum tubes (H01J 25/00, H01J 31/00 - H01J 37/00, H01J 43/00 take precedence; details of vacuum tubes H01J 19/00; cathode ray or electron stream lamps H01J 63/00)

Definition statement
This place covers:
Tubes in which the electron stream is not altered in other ways than on/off.
References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Description</th>
<th>CPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transit-time tubes, e.g. Klystrons, travelling-wave tubes, magnetrons</td>
<td>H01J 25/00</td>
</tr>
<tr>
<td>Cathode ray tubes; Electron beam tubes</td>
<td>H01J 31/00</td>
</tr>
<tr>
<td>Discharge tubes with provision for emergence of electrons or ions from the vessel</td>
<td>H01J 33/00</td>
</tr>
<tr>
<td>X-ray tubes</td>
<td>H01J 35/00</td>
</tr>
<tr>
<td>Discharge tubes with provision for introducing objects or material to be exposed to the discharge, e.g. for the purpose of examination or processing thereof</td>
<td>H01J 37/00</td>
</tr>
<tr>
<td>Secondary-emission tubes; Electron-multiplier tubes</td>
<td>H01J 43/00</td>
</tr>
<tr>
<td>Cathode-ray or electron-stream lamps</td>
<td>H01J 63/00</td>
</tr>
</tbody>
</table>

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Description</th>
<th>CPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Details of vacuum tubes</td>
<td>H01J 19/00</td>
</tr>
</tbody>
</table>

H01J 21/20

Tubes with more than one discharge path; Multiple tubes, e.g. double diode, triode-hexode (secondary-emission tubes, electron-multiplier tubes H01J 43/00)

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Description</th>
<th>CPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary-emission tubes, electron-multiplier tubes</td>
<td>H01J 43/00</td>
</tr>
</tbody>
</table>

H01J 21/34

Tubes with electrode system arranged or dimensioned so as to eliminate transit-time effect (with flat electrodes H01J 21/36)

References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Description</th>
<th>CPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flat electrodes</td>
<td>H01J 21/36</td>
</tr>
</tbody>
</table>
H01J 23/00
Details of transit-time tubes of the types covered by group H01J 25/00

Definition statement
This place covers:
Details of tubes in which the electron stream is altered in other ways than on/off.

Synonyms and Keywords
In patent documents, the following abbreviations are often used:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TWT</td>
<td>traveling wave tube</td>
</tr>
<tr>
<td>TWTA</td>
<td>traveling wave tube amplifier</td>
</tr>
<tr>
<td>Vircator</td>
<td>virtual cathode oscillator</td>
</tr>
</tbody>
</table>

H01J 23/02
Electrodes; Magnetic control means; Screens (associated with resonator or delay system H01J 23/16)

References
Limiting references
This place does not cover:

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Means associated with resonator or delay system</td>
<td>H01J 23/16</td>
</tr>
</tbody>
</table>

H01J 23/065
producing a solid cylindrical beam (H01J 23/075 takes precedence)

References
Limiting references
This place does not cover:

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnetron injection guns</td>
<td>H01J 23/075</td>
</tr>
</tbody>
</table>

H01J 23/07
producing a hollow cylindrical beam (H01J 23/075 takes precedence)

References
Limiting references
This place does not cover:

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnetron injection guns</td>
<td>H01J 23/075</td>
</tr>
</tbody>
</table>
H01J 23/09
Electric systems for directing or deflecting the discharge along a desired path, e.g. E-type (focusing arrangements H01J 23/08)

References
Limiting references
This place does not cover:

Focusing arrangements

H01J 23/08

H01J 23/10
Magnet systems for directing or deflecting the discharge along a desired path, e.g. a spiral path (magnetic focusing arrangements H01J 23/08)

References
Limiting references
This place does not cover:

Magnetic focusing arrangements

H01J 23/08

H01J 23/11
Means for reducing noise (in electron or ion gun H01J 23/06)

References
Limiting references
This place does not cover:

Means for reducing noise in electron or ion gun

H01J 23/06

H01J 23/42
the interaction circuit being a helix or a helix-derived slow-wave structure (H01J 23/44 - H01J 23/48 take precedence)

References
Limiting references
This place does not cover:

Rod-type coupling devices

H01J 23/44

Loop coupling devices

H01J 23/46

Devices for linking interaction circuit with coaxial lines; Devices of the coupled helices type

H01J 23/48
**H01J 23/44**

Rod-type coupling devices (*H01J 23/46, H01J 23/48, H01J 23/54* take precedence)

**References**

*Limiting references*

*This place does not cover:*

<table>
<thead>
<tr>
<th>Loop coupling devices</th>
<th>H01J 23/46</th>
</tr>
</thead>
<tbody>
<tr>
<td>Devices for linking interaction circuit with coaxial lines; Devices of the coupled helices type</td>
<td>H01J 23/48</td>
</tr>
<tr>
<td>Filtering devices preventing unwanted frequencies or modes to be coupled to, or out of, the interaction circuit; Prevention of high frequency leakage in the environment</td>
<td>H01J 23/54</td>
</tr>
</tbody>
</table>

**H01J 23/48**

for linking interaction circuit with coaxial lines; Devices of the coupled helices type (*H01J 23/46* takes precedence)

**References**

*Limiting references*

*This place does not cover:*

<table>
<thead>
<tr>
<th>Loop coupling devices</th>
<th>H01J 23/46</th>
</tr>
</thead>
</table>

**H01J 23/50**

the interaction circuit being a helix or derived from a helix (*H01J 23/52* takes precedence)

**References**

*Limiting references*

*This place does not cover:*

| Coupled helices being disposed coaxially around one another | H01J 23/52 |

**H01J 25/00**

Transit-time tubes, e.g. klystrons, travelling-wave tubes, magnetrons (details of transit-time tubes *H01J 23/00*; particle accelerators *H05H*)

**Definition statement**

*This place covers:*

Tubes in which the electron stream is altered in other ways than on/off.

| Details of transit-time tubes | H01J 23/00 |
Particle accelerators
Tubes in which the electron stream is only switched on/off

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

Common microwave oven magnetrons

Synonyms and Keywords
In patent documents, the following abbreviations are often used:

TWT traveling wave tube
TWTA traveling wave tube amplifier
Vircator virtual cathode oscillator

H01J 25/02
Tubes with electron stream modulated in velocity or density in a modulator zone and thereafter giving up energy in an inducing zone, the zones being associated with one or more resonators (tubes in which a travelling-wave is simulated at spaced gaps H01J 25/34)

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

Tubes in which a travelling-wave is simulated at spaced gaps

H01J 25/42
Tubes in which an electron stream interacts with a wave travelling along a delay line or equivalent sequence of impedance elements, and with a magnet system producing an H-field crossing the E-field (with travelling wave moving completely around the electron space H01J 25/50)

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

Tubes with travelling wave moving completely around the electron space
**H01J 25/50**

Magnetrons, i.e. tubes with a magnet system producing an H-field crossing the E-field (with travelling wave not moving completely around the electron space **H01J 25/42**; functioning with plural reflection or with reversed cyclotron action **H01J 25/62, H01J 25/64**)

**References**

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

| Magnetrons with travelling wave not moving completely around the electron space | H01J 25/42 |
| Functioning with plural reflection or with reversed cyclotron action | H01J 25/62, H01J 25/64 |

**H01J 25/54**

having only one cavity or other resonator, e.g. neutrode tube (having a composite resonator **H01J 25/58**)

**References**

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

| Composite resonator | H01J 25/58 |

**H01J 25/68**

Tubes specially designed to act as oscillator with positive grid and retarding field, e.g. for Barkhausen-Kurz oscillators (with secondary emission **H01J 25/76**)

**References**

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

| Tubes with secondary emission | H01J 25/76 |

**H01J 25/72**

in which a standing wave or a considerable part thereof is produced along an electrode, e.g. Clavier tube (with resonator having distributed inductance and capacitance **H01J 25/70**)

**References**

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

| Tubes with resonator having distributed inductance and capacitance | H01J 25/70 |
**H01J 25/74**

Tubes specially designed to act as transit-time diode oscillators, e.g. monotron (with secondary emission H01J 25/76)

**References**

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

| Tubes with secondary emission | H01J 25/76 |

**H01J 27/00**

Ion beam tubes (H01J 25/00, H01J 33/00, H01J 37/00 take precedence; particle accelerators H05H)

**Definition statement**

This place covers:

Electric discharge tubes generating a beam of ions

**References**

*Limiting references*

This place does not cover:

| Ion guns common to two or more basic types of discharges | H01J 3/04 |
| Transit-time tubes, e.g. Klystrons, travelling-wave tubes, magnetrons | H01J 25/00 |
| Discharge tubes with provision for emergence of electrons or ions from the vessel | H01J 33/00 |
| Discharge tubes with provision for introducing objects or material to be exposed to the discharge, e.g. for the purpose of examination or processing thereof | H01J 37/00 |
| Devices providing for corona discharge | H01T 19/00 |
| Apparatus for generating ions to be introduced into non-enclosed gases, e.g. into the atmosphere | H01T 23/00 |
| Particle accelerators | H05H |
| Generating plasma | H05H 1/24 |

**Application-oriented references**

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

| Ion sources for discharge tubes with provision for introducing objects or material to be exposed to the discharge, e.g. for ion implanters or ion microscopes | H01J 37/08 |
| Ion sources for particle spectrometers | H01J 49/10 |
| Ion thrusters | F03H 1/00 |
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Arrangements for handling radiation or particles, e.g. focusing, moderating | G21K 1/00 |

H01J 27/02

Ion sources; Ion guns {(for examination or processing discharge tubes H01J 37/08; ion sources, ion guns for particle spectrometer or separator tubes H01J 49/10; ion propulsion F03H 1/00); arrangements for handling particles, e.g. focusing, {charge exchanging, polarising}, G21K 1/00; generating ions to be introduced into non-enclosed gases H01T 23/00; generating plasma H05H 1/24)

References
Limiting references
This place does not cover:

| Ion guns for examination or processing discharge tubes | H01J 37/08 |
| Ion sources, ion guns for particle spectrometer or separator tubes | H01J 49/10 |

Informative references
Attention is drawn to the following places, which may be of interest for search:

| Ion propulsion | F03H 1/00 |
| Arrangements for handling particles, e.g. focusing charge exchanging, polarising | G21K 1/00 |
| Generating ions to be introduced into non-enclosed gases | H01T 23/00 |
| Generating plasma | H05H 1/24 |

H01J 27/04

using reflex discharge, e.g. Penning ion sources {(electron bombardment ion sources H01J 27/08)}

References
Limiting references
This place does not cover:

| Electron bombardment ion sources | H01J 27/08 |
H01J 27/26

using surface ionisation, e.g. field effect ion sources, thermonic ion sources
(H01J 27/20, H01J 27/24 take precedence)

References

Limiting references

This place does not cover:

| Particle beam bombardment, e.g. ionisers       | H01J 27/20 |
| Photo-ionisation, e.g. using laser beam        | H01J 27/24 |

H01J 29/00

Details of cathode-ray tubes or of electron-beam tubes of the types covered by group H01J 31/00

Definition statement

This place covers:

Details of cathode ray tubes or of electron beam tubes of the types covered by group H01J 31/00, as far as the details are an integral component of (structurally combined with) the tubes.

In particular: Electrodes; Screens (e.g. luminescent screens); Electron-optical arrangements (e.g. control electrodes, electron guns, focusing and deflection arrangements); Vessels; Optical or photographic arrangements structurally combined with the vessel; Leading-in arrangements; Seals; Means forming part of the tube for the purpose of providing electrical connection to it; Means for obtaining or maintaining the desired pressure within the tube; Selection of substances for gas fillings; Circuit elements structurally associated with the tube

Further information:

Generally only the following ECLA subgroups of H01J 29/00 cover electron emission display panels (e.g. field emission display panels):

H01J 29/006 (cooling means); H01J 29/02 (electrodes); H01J 29/04 (cathodes); H01J 29/085 (anode plates, in particular anode electrode(s)); H01J 29/20, H01J 29/22, H01J 29/28, H01J 29/30-H01J 29/327 (luminescent screens, including reflective layers and black matrix associated therewith); H01J 29/467, H01J 29/481 (control electrodes / control electrode structures, (gate electrodes; focusing electrodes; insulating layers between the cathode electrodes and the gate electrodes or between the gate electrodes and the focusing electrodes)); H01J 29/86, H01J 29/862, H01J 29/863, H01J 29/864, H01J 29/868, H01J 29/88, H01J 29/89, H01J 29/896, H01J 29/898 (vessels; including faceplate (front substrate), backplate (rear substrate), frame between the plates, spacers / barrier ribs between the faceplate and the backplate; sealings of the vessel; optical arrangements or shielding arrangements (e.g. filters) integral with or directly attached to the display panel, e.g. to the front substrate); H01J 29/90 (leading in arrangements; seals therefor); H01J 29/92, H01J 29/925 (means forming part of the display panel for the purpose of providing electrical connection to it, e.g. terminal arrangements); H01J 29/94 (means for exhausting the vessel or maintaining vacuum within the vessel); H01J 29/96 (circuit arrangements structurally associated with the display panels, e.g. resistive / capacitive circuit elements to adapt/control the applied electric potentials)
References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Description</th>
<th>CPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stands or trestles as supports for display apparatus</td>
<td>F16M 11/00</td>
</tr>
<tr>
<td>Control circuits for electron emission display panels or methods of driving thereof</td>
<td>G09G 3/22</td>
</tr>
<tr>
<td>Electrical connectors not integral with the display panel</td>
<td>H01R</td>
</tr>
<tr>
<td>Control circuits for cathode ray tubes or methods of driving thereof</td>
<td>H04N 3/00, H04N 5/00</td>
</tr>
<tr>
<td>Printed circuit boards for electron emission display apparatus; arrangement and connection thereof (e.g. to the electrodes of the display panel) when not integral with the display panel</td>
<td>H05K 1/00, H05K 3/00</td>
</tr>
<tr>
<td>Casings or cabinets of display apparatus not integral with the display panel</td>
<td>H05K 5/00, H05K 7/14</td>
</tr>
<tr>
<td>Supporting structures in these casings or cabinets for circuit boards not integral with the display panel</td>
<td>H05K 7/20954</td>
</tr>
<tr>
<td>Cooling or ventilating arrangements of display apparatus, when not integral with the display panel</td>
<td>H05K 7/20954</td>
</tr>
<tr>
<td>EMI shielding filters of display panels when not integral with or directly attached to the display panel</td>
<td>H05K 9/0096</td>
</tr>
</tbody>
</table>

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Description</th>
<th>CPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apparatus or processes specially adapted for the manufacture of details of H01J 29/00</td>
<td>H01J 9/00</td>
</tr>
</tbody>
</table>

Electrodes

<table>
<thead>
<tr>
<th>Description</th>
<th>CPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microstructural devices or systems and manufacture thereof</td>
<td>B81B, B81C</td>
</tr>
<tr>
<td>Nanostructures and manufacture thereof</td>
<td>B82B</td>
</tr>
<tr>
<td>Nanotechnology</td>
<td>B82Y</td>
</tr>
<tr>
<td>Carbon and compounds thereof; manufacture thereof CNT material and manufacture thereof</td>
<td>C01B 32/00, C01B 32/158</td>
</tr>
<tr>
<td>Metal coating of glasses</td>
<td>C03C 17/06</td>
</tr>
<tr>
<td>Multilayer metal coating of glasses</td>
<td>C03C 17/36</td>
</tr>
<tr>
<td>PZT (lead zirconate titanate) emitter materials and manufacture thereof</td>
<td>C04B 35/491</td>
</tr>
<tr>
<td>Metallurgy</td>
<td>C21, C22</td>
</tr>
<tr>
<td>Metal alloys</td>
<td>C22C</td>
</tr>
<tr>
<td>Coating (e.g. of metal or dielectric materials)</td>
<td>C23C</td>
</tr>
<tr>
<td>Deposition of carbon by e.g. chemical vapour deposition</td>
<td>C23C 16/26</td>
</tr>
<tr>
<td>Electrolytic or electrophoretic production of coatings, g of CNT and carbon fibres on a substrate</td>
<td>C25D, C25D 15/00</td>
</tr>
<tr>
<td>Secondary-emission detectors for measurement of nuclear or X-radiation</td>
<td>G01T 1/28</td>
</tr>
<tr>
<td>Photolithographic production of patterned surfaces; photosensitive materials therefor</td>
<td>G03F 7/00</td>
</tr>
</tbody>
</table>
### Conductors or conductive bodies characterised by the conductive materials; Selection of materials as conductors

- **H01B 1/00**

### Filaments for incandescent lamps

- **H01K 1/02**

### Luminescent screens

- **Luminescent materials or compositions** - **C09K 11/00**
- **Luminescent screens for X-ray purposes** - **G21K 4/00**

### Vessels

- **Soldering; welding; working by laser beam** - **B23K, B23K 26/00**
- **Layered products characterised by the relation between layers, e.g. by using adhesives**
  - **Layered products essentially comprising sheet glass**
  - **Layered products essentially comprising synthetic resin**
  - **B32B 7/00, B32B 7/12, B32B 17/00, B32B 27/00**
- **Laminating glass layers** - **B32C17/10**
- **Reforming and uniting glass sheets by fusing** - **C03B 23/00**
- **Glass compositions** - **C03C 3/00 - C03C 4/00**
- **Fusion frit compositions** - **C03C 8/24**
- **Glass ceramics** - **C03C 10/00**
- **Surface treatment of glass by coating (e.g. with dielectric materials)**
  - **C03C 15/00 - C03C 25/00, C03C 17/00**
- **Joining glass to glass other than by fusing; Joining pieces of glass to pieces of other inorganic material** - **C03C 27/00**
- **Ceramics** - **C04B 35/00**
- **Adhesives** - **C09J**
- **Coating (e.g. of metal or dielectric materials) by vacuum evaporation, by sputtering or by ion implantation by chemical vapour deposition**
  - **C23C, C23C 14/00, C23C 16/00**
- **Units comprising two or more parallel glass of like panes permanently secured together** - **E06B23/00**
- **Stands or trestles as supports for display apparatus** - **F16M 11/00**
- **Optical elements characterised by the material other than lenses**
  - **G02B, G02B 1/00, G02B 5/00**
- **Coatings on or surface treatment of optical elements**
  - **Antireflection coatings in general**
  - **G02B 1/10, G02B 1/11**
- **Optical filters in general** - **G02B 5/20**
- **Touch screens** - **G06F 3/00**
- **Casings or cabinets of display apparatus not integral with the display panel**
  - **Supporting structures in these casings or cabinets for circuit boards not integral with the display panel**
  - **H05K 5/00, H05K 7/14**
- **Screening against electric or magnetic fields** - **H05K 9/00**
- **EMI shielding filters of display panels when not integral with or directly attached to the display panel** - **H05K 9/0096**
Connecting or feeding means; control circuits / driving methods

<table>
<thead>
<tr>
<th>Control circuits for electron emission displays or methods of driving thereof</th>
<th>G09G 3/22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connecting elements (e.g. connection terminals) for connection of / to printed circuits (e.g. printed circuit boards)</td>
<td>H01R 12/00</td>
</tr>
<tr>
<td>Control circuits for cathode ray tubes or methods of driving thereof</td>
<td>H04N 3/00, H04N 5/00</td>
</tr>
<tr>
<td>Printed circuits / circuit boards (e.g. for display apparatus); arrangement and connection thereof Printed elements for providing electric connections to or between printed circuits Structural association of two or more printed circuits Printed circuits structurally associated with non-printed electric components Apparatus or processes for manufacturing of printed circuits Assembling printed circuits with other printed circuits</td>
<td>H05K 1/00, H05K 1/11, H05K 1/14, H05K 1/18, H05K 3/00, H05K 3/36</td>
</tr>
</tbody>
</table>

Cooling

| Cooling or ventilating arrangements of display apparatus, when not integral with the display panel | H05K 7/20954 |

Special rules of classification

- Classification of the type of tube in H01J 31/00 and of the relevant details in H01J 29/00 is obligatory.
- The Indexing Codes H01J 2329/00 are numbered in correspondence to subgroups of H01J 29/00, but in much more detail.
- Groups H01J 29/48 - H01J 29/51 take precedence over groups H01J 29/52-H01J 29/68.
- Details of electron emission display panels (e.g. field emission display panels) are classified obligatory in both H01J 29/00 and H01J 2329/00, even for details for which H01J 2329/00 does not provide a more detailed relevant subgroup than H01J 29/00.
- Details of other tubes of H01J 31/00, in particular of classical cathode ray tubes, are classified in H01J 29/00 and - in case of a more detailed relevant Indexing Code subgroup - also in H01J 2229/00.
- Details of cathode-ray or electron stream lamps, in particular of flat panel electron emission lamps as LCD backlight, are classified in H01J 63/00.
- If an electron emission display panel and a flat panel electron emission lamp as LCD backlight is disclosed, classification in H01J 29/00, H01J 2329/00, H01J 31/127 and H01J 63/00 is provided.
- When details are disclosed for different types of flat panel displays (e.g. plasma display panels, electron emission display panels, LCD display panels, OLED display panels), classification is provided for each type thereof.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FED</td>
<td>Field emission display / device</td>
</tr>
<tr>
<td>CRT</td>
<td>Cathode ray tube</td>
</tr>
<tr>
<td>EMI (shielding)</td>
<td>Electromagnetic interference (shielding)</td>
</tr>
<tr>
<td>NIR (shielding)</td>
<td>Near infrared (shielding)</td>
</tr>
<tr>
<td>AR (film)</td>
<td>Antireflection (film)</td>
</tr>
</tbody>
</table>
H01J 29/04
Cathodes (electron guns H01J 29/48)

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

Electron guns H01J 29/48

H01J 29/08
Electrodes intimately associated with a screen on or from which an image or pattern is formed, picked up, converted, or stored, e.g. backing-plates for storage tube, for collecting secondary electrons (arrangements for colour switching H01J 29/80)

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

Arrangements for colour switching H01J 29/80

H01J 29/20
characterised by the luminescent material {{for luminescent screens for X-ray purposes G21K 4/00}}

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

Luminescent screens for X-ray purposes G21K 4/00

H01J 29/38
not using charge storage, e.g. photo-emissive screen, extended cathode {{(electrodes using photo-emission in general H01J 1/34)}}

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

Electrodes using photo-emission in general H01J 1/34
**H01J 29/39**

Charge-storage screens {{H01J 29/395 takes precedence}}

**References**

*Limiting references*

This place does not cover:

| Charge-storage grids exhibiting triode effect | H01J 29/395 |

**H01J 29/41**

using secondary emission, e.g. for supericonoscope {{electrodes using secondary emission in general H01J 1/32; secondary emission tubes H01J 43/00}}

**References**

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

| Electrodes using secondary emission in general | H01J 1/32 |
| Secondary emission tubes | H01J 43/00 |

**H01J 29/44**

exhibiting internal electric effects caused by particle radiation, e.g. bombardment-induced conductivity {{particle detectors exhibiting internal electric effects G01T 1/26}}

**References**

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

| Article detectors exhibiting internal electric effects | G01T 1/26 |

**H01J 29/45**

exhibiting internal electric effects caused by electromagnetic radiation, e.g. photoconductive screen, photodielectric screen, photovoltaic screen {{(photoconductive layers for electrography G03G 5/00)}}

**References**

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

| Photoconductive layers for electrography | G03G 5/00 |
H01J 29/46

Arrangements of electrodes and associated parts for generating or controlling the ray or beam, e.g. electron-optical arrangement {(transit time tubes H01J 23/00, H01J 25/00; X-ray tubes H01J 35/00; beam tubes for examining ions, e.g. electron or ion microscopes, or processing of objects or materials, e.g. electron or ion beam tubes H01J 37/04; electron multipliers H01J 43/04; handling of radiation or particles, e.g. focusing, deviating, not otherwise provided for G21K 1/00)}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Arrangement</th>
<th>H01J Code(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transit time tubes</td>
<td>H01J 23/00, H01J 25/00</td>
</tr>
<tr>
<td>X-ray tubes</td>
<td>H01J 35/00</td>
</tr>
<tr>
<td>Beam tubes for examining ions, e.g. electron or ion microscopes, or processing of objects or materials e.g. electron or ion beam tubes</td>
<td>H01J 37/04</td>
</tr>
<tr>
<td>Electron multipliers</td>
<td>H01J 43/04</td>
</tr>
<tr>
<td>Handling of radiation or particles, e.g. focusing, deviating, not otherwise provided for</td>
<td>G21K 1/00</td>
</tr>
</tbody>
</table>

H01J 29/50

two or more guns in a single vacuum space, e.g. for plural-ray tube (H01J 29/51 takes precedence)

References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Arrangement</th>
<th>H01J Code(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arrangements for controlling convergence of a plurality of beams by means of electric field</td>
<td>H01J 29/51</td>
</tr>
</tbody>
</table>

H01J 29/52

Arrangements for controlling intensity of ray or beam, e.g. for modulation {(H01J 29/467 takes precedence)}

References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Arrangement</th>
<th>H01J Code(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control electrodes for flat display tubes,</td>
<td>H01J 29/467</td>
</tr>
</tbody>
</table>
H01J 29/54
Arrangements for centring ray or beam ((H01J 29/467 takes precedence))

References
Limiting references
This place does not cover:

| Control electrodes for flat display tubes, | H01J 29/467 |

H01J 29/56
Arrangements for controlling cross-section of ray or beam; Arrangements for correcting aberration of beam, e.g. due to lenses ((H01J 29/467 takes precedence))

References
Limiting references
This place does not cover:

| Control electrodes for flat display tubes, | H01J 29/467 |

H01J 29/58
Arrangements for focusing or reflecting ray or beam ((H01J 29/467, H01J 29/585 take precedence))

References
Limiting references
This place does not cover:

| Control electrodes for flat display tubes, | H01J 29/467 |
| Arrangements for focusing or reflecting ray or beam in which the transit time of the electrons has to be taken into account | H01J 29/585 |

H01J 29/70
Arrangements for deflecting ray or beam ((H01J 29/467, H01J 29/525, H01J 29/701, H01J 29/708 take precedence ); circuit arrangements for producing saw-tooth pulses or other deflecting voltages or currents H03K)

References
Limiting references
This place does not cover:

| Control electrodes for flat display tubes, | H01J 29/467 |
| Digitally controlled systems, e.g. Digisplay | H01J 29/525 |
Systems for correcting deviation or convergence of a plurality of beams by means of magnetic fields at least

H01J 29/701

Arrangements in which the transit time of the electrons has to be taken into account

H01J 29/708

Informative references
Attention is drawn to the following places, which may be of interest for search:

Circuit arrangements for producing saw-tooth pulses or other deflecting voltages or currents

H03K

H01J 29/80
Arrangements for controlling the ray or beam after passing the main deflection system, e.g. for post-acceleration or post-concentration, for colour switching (H01J 29/701 takes precedence)

References

Limiting references
This place does not cover:

Systems for correcting deviation or convergence of a plurality of beams by means of magnetic fields at least

H01J 29/701

H01J 29/81
using shadow masks (shadow masks per se H01J 29/07)

References

Informative references
Attention is drawn to the following places, which may be of interest for search:

Shadow masks per se

H01J 29/07

H01J 29/84
Traps for removing or diverting unwanted particles, e.g. negative ions, fringing electrons; Arrangements for velocity or mass selection (particle spectrometer or separator tubes H01J 49/00)

References

Limiting references
This place does not cover:

Particle spectrometer or separator tubes

H01J 49/00
**H01J 29/88**

provided with coatings on the walls thereof; Selection of materials for the coatings ({{H01J 29/868 and H01J 29/89 take precedence } ; luminescent screens H01J 29/18})

**References**

*Limiting references*

*This place does not cover:*

<table>
<thead>
<tr>
<th>Material</th>
<th>CPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luminescent screens</td>
<td>H01J 29/18</td>
</tr>
<tr>
<td>Screens covering the input or output face of the vessel, e.g. transparent anti-static coatings, X-ray absorbing layers</td>
<td>H01J 29/868</td>
</tr>
<tr>
<td>Optical or photographic arrangements structurally combined or co-operating with the vessel</td>
<td>H01J 29/89</td>
</tr>
</tbody>
</table>

**H01J 29/89**

Optical or photographic arrangements structurally combined {or co-operating} with the vessel ({{H01J 29/866 and H01J 29/868 take precedence}})

**References**

*Limiting references*

*This place does not cover:*

<table>
<thead>
<tr>
<th>Device</th>
<th>CPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Devices for introducing a recording support into the vessel</td>
<td>H01J 29/866</td>
</tr>
<tr>
<td>Screens covering the input or output face of the vessel, e.g. transparent anti-static coatings, X-ray absorbing layers</td>
<td>H01J 29/868</td>
</tr>
</tbody>
</table>

**H01J 29/94**

Selection of substances for gas fillings; Means for obtaining or maintaining the desired pressure within the tube, e.g. by gettering {{exhausting, degassing, gettering of electric discharge tubes in general H01J 9/38}}

**References**

*Informative references*

*Attention is drawn to the following places, which may be of interest for search:*

<table>
<thead>
<tr>
<th>Operation</th>
<th>CPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exhausting, degassing, gettering of electric discharge tubes in general</td>
<td>H01J 9/38</td>
</tr>
</tbody>
</table>
**H01J 31/00**

Cathode ray tubes; Electron beam tubes (**H01J 25/00**, **H01J 35/00**, **H01J 37/00** take precedence; cathode ray or electron stream lamps **H01J 63/00**; details of cathode ray tubes or of electron beam tubes **H01J 29/00**)

**Definition statement**

*This place covers:*

Cathode ray tubes and electron beam tubes, as far as the tubes per se are concerned.

In particular: Electron emission display panels of the field emission type (field emission display panels, FED), semiconductor type, metal-insulator-metal (MIM) type or thin film type (surface conduction emission type); classical cathode ray tubes for TV and monitor use; pick up tubes (input of electromagnetic radiation, e.g. visible light, and electric output); image-conversion and image-amplification tubes

Further information:

Cathode-ray or electron stream lamps, in particular flat panel electron emission lamps as LCD backlight, are covered by **H01J 63/00**.

**References**

**Limiting references**

*This place does not cover:*

<table>
<thead>
<tr>
<th>Tubes of <strong>H01J 25/00</strong>, <strong>H01J 33/00</strong> - <strong>H01J 49/00</strong></th>
<th><strong>H01J 25/00</strong>, <strong>H01J 33/00</strong> - <strong>H01J 49/00</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Details of tubes of <strong>H01J 31/00</strong></td>
<td><strong>H01J 29/00</strong></td>
</tr>
<tr>
<td>Cathode-ray or electron stream lamps, in particular flat panel electron emission lamps as LCD backlight</td>
<td><strong>H01J 63/00</strong></td>
</tr>
<tr>
<td>Particle accelerators</td>
<td><strong>H05H 3/00</strong> - <strong>H05H 15/00</strong></td>
</tr>
</tbody>
</table>

**Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

<table>
<thead>
<tr>
<th>Apparatuses or processes specially adapted for the manufacture of tubes of <strong>H01J 31/00</strong></th>
<th><strong>H01J 9/00</strong></th>
</tr>
</thead>
</table>

Other types of displays

<table>
<thead>
<tr>
<th>Alternating current plasma display panels (AC-PDP)</th>
<th><strong>H01J 11/00</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Plasma addressed liquid crystal devices (PALC)</td>
<td><strong>H01J 17/485</strong>, <strong>G02F 1/13334</strong></td>
</tr>
<tr>
<td>Direct current plasma display panels (DC-PDP)</td>
<td><strong>H01J 17/49</strong></td>
</tr>
<tr>
<td>Liquid crystal displays (LCD)</td>
<td><strong>G02F 1/13</strong></td>
</tr>
<tr>
<td>Electrophoretic displays</td>
<td><strong>G02F 1/167</strong></td>
</tr>
<tr>
<td>LED displays</td>
<td><strong>G09F 9/33</strong>, <strong>H01L 25/0753</strong></td>
</tr>
<tr>
<td>Displays using organic light-emitting diodes (OLED)</td>
<td><strong>H01L 27/32</strong></td>
</tr>
<tr>
<td>Organic light-emitting diodes (OLED) per se</td>
<td><strong>H01L 51/50</strong></td>
</tr>
</tbody>
</table>
General aspects regarding displays/displaying

<table>
<thead>
<tr>
<th>Touch screens</th>
<th>G06F 3/00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displaying; advertising; signsIndicating arrangements for variable information in which the information is built-up on a support by selection or combination of individual elements</td>
<td>G09F, G09F 9/00</td>
</tr>
</tbody>
</table>

Lamps, e.g. flat panel lamps

<table>
<thead>
<tr>
<th>Discharge lamps</th>
<th>H01J 61/00- H01J 65/00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cathode-ray or electron stream lamps, in particular flat panel electron emission lamps as LCD backlight</td>
<td>H01J 63/00</td>
</tr>
<tr>
<td>Light sources using semiconductor devices as light-generating elements, e.g. using light-emitting diodes [LED] or lasers</td>
<td>F21K 9/00</td>
</tr>
<tr>
<td>Light emitting diodes (LED) per se</td>
<td>H01L 33/00</td>
</tr>
<tr>
<td>Electroluminescent light sources</td>
<td>H05B 33/00</td>
</tr>
<tr>
<td>Electric lamps using a combination of different types of light generation</td>
<td>H05B 35/00</td>
</tr>
</tbody>
</table>

Others

<table>
<thead>
<tr>
<th>Telescopes, viewfinders, optical aiming devices with means for image conversion or intensification, e.g. night vision systems</th>
<th>G02B 23/12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conversion screens for the conversion of the spatial distribution of X-rays or particle radiation into visible images</td>
<td>G21K 4/00</td>
</tr>
<tr>
<td>Solid state imager structures, e.g. CCD imagers</td>
<td>H01L 27/146</td>
</tr>
</tbody>
</table>

Special rules of classification

- Classification of the type of tube in H01J 31/00 and of the relevant details in H01J 29/00 is obligatory.
- Most electron emission display panels, comprising matrix-arrayed electron emission sources and pixels / pixel groups, are classified in H01J 31/127. If the arrangement of the electron emission sources and of the pixels / pixel groups is not indicated, e.g. in case of a front filter of a general electron emission display panel (with the filter being integral with the front substrate of the panel), H01J 31/123 is provided.
- Indexing Code symbols H01J 2231/00 are assigned, in addition to ECLA classification symbols H01J 31/00, in case of a more detailed relevant Indexing Code subgroup, with the exception of electron emission display panels.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

| FED | field emission display / device |
| CRT | cathode ray tube |
**H01J 31/02**

having one or more output electrodes which may be impacted selectively by the ray or beam, and onto, from, or over which the ray or beam may be deflected or de-focused {(pulse counting circuits therewith H03K 29/06)}

**References**

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

| Pulse counting circuits therewith | H03K 29/06 |

**H01J 31/14**

Magic-eye or analogous tuning indicators {(mounting of visual indicators in a radio set H03J 1/04; circuits for timing indicators H03J 3/14)}

**References**

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

| Mounting of visual indicators in a radio set | H03J 1/04 |
| Circuits for timing indicators | H03J 3/14 |

**H01J 31/15**

with ray or beam selectively directed to luminescent anode segments {(printing by application of radiation B41J 2/447)}

**References**

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

| Printing by application of radiation | B41J 2/447 |

**H01J 31/16**

with mask carrying a number of selectively displayable signs, e.g. charactron, numeroscope {(tubes with a mask carrying a matrix of openings, a selection of which permits a sign to be displayed H01J 31/128)}

**References**

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

| Tubes with a mask carrying a matrix of openings, a selection of which permits a sign to be displayed | H01J 31/125 |
H01J 31/18
with image written by a ray or beam on a grid-like charge-accumulating screen, and with a ray or beam passing through and influenced by this screen before striking the luminescent screen, e.g. direct-view storage tube {(charge storage grids exhibiting triode effect H01J 29/395)}

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Charge storage grids exhibiting triode effect | H01J 29/395 |

H01J 31/20
for displaying images or patterns in two or more colours {(circuits for colour television H04N 9/16 - H04N 9/28)}

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Circuits for colour television | H04N 9/16 - H04N 9/28 |

H01J 31/24
with screen acting as light valve by shutter operation, e.g. eidophor {(projection arrangements for image reproduction, e.g. using eidophor H04N 5/74)}

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Projection arrangements for image reproduction, e.g. using eidophor | H04N 5/74 |

H01J 31/26
Image pick-up tubes having an input of visible light and electric output (tubes without defined electron beams and having a light ray scanning photo-emissive screen H01J 40/20)

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Tubes without defined electron beams and having a light ray scanning photo-emissive screen | H01J 40/20 |
**H01J 31/28**

with electron ray scanning the image screen \{(H01J 31/283, H01J 31/286 take precedence)\}

References

**Limiting references**

*This place does not cover:*

<table>
<thead>
<tr>
<th>Reference Description</th>
<th>CPC Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image pick-up tubes having with electron ray scanning the image screen</td>
<td>H01J 31/28</td>
</tr>
<tr>
<td>Image pick-up tubes having with electron ray scanning the image screen with a target comprising semiconductor junctions</td>
<td>H01J 31/283</td>
</tr>
</tbody>
</table>

**H01J 31/46**

 Tubes in which electrical output represents both intensity and colour of image \{(colour television cameras with only one tube H04N 9/07)\}

References

**Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

<table>
<thead>
<tr>
<th>Reference Description</th>
<th>CPC Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour television cameras with only one tube</td>
<td>H04N 9/07</td>
</tr>
</tbody>
</table>

**H01J 31/58**

 Tubes for storage of image or information pattern or for conversion of definition of television or like images, i.e. having electrical input and electrical output \{(electrostatic memories using electron beam tubes G11C 11/23)\}

References

**Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

<table>
<thead>
<tr>
<th>Reference Description</th>
<th>CPC Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrostatic memories using electron beam tubes</td>
<td>G11C 11/23</td>
</tr>
</tbody>
</table>

**H01J 31/60**

having means for deflecting, either selectively or sequentially, an electron ray on to separate surface elements of the screen (by circuitry alone H01J 29/08)

References

**Limiting references**

*This place does not cover:*

<table>
<thead>
<tr>
<th>Reference Description</th>
<th>CPC Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deflecting an electron ray on to separate surface elements of the screen by circuitry alone</td>
<td>H01J 29/08</td>
</tr>
</tbody>
</table>
**H01J 33/00**

Discharge tubes with provision for emergence of electrons or ions from the vessel (irradiation devices G21K; particle accelerators H05H); Lenard tubes

**Definition statement**

*This place covers:*

Discharge tubes with provision for emergence of electrons or ions from the vessel and Lenard tubes, as far as the tubes per se are concerned; and details thereof, as far as the details are an integral component of the tubes.

In particular: Electron beam permeable/transparent windows

**References**

**Limiting references**

*This place does not cover:*

<table>
<thead>
<tr>
<th>Category</th>
<th>CPC Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irradiation devices</td>
<td>G21K 5/00</td>
</tr>
<tr>
<td>Particle accelerators</td>
<td>H05H 3/00-15/00</td>
</tr>
</tbody>
</table>

**Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

<table>
<thead>
<tr>
<th>Category</th>
<th>CPC Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apparatuses or processes specially adapted for the manufacture of tubes of H01J 33/00</td>
<td>H01J 9/00</td>
</tr>
<tr>
<td>Discharge tubes with provision for introducing objects or material to be exposed to the discharge</td>
<td>H01J 37/00</td>
</tr>
<tr>
<td>Irradiation devices</td>
<td>G21K 5/00</td>
</tr>
</tbody>
</table>

**H01J 33/02**

Details {(vessels for operation at high tension H01J 5/06)}

**References**

**Limiting references**

*This place does not cover:*

<table>
<thead>
<tr>
<th>Category</th>
<th>CPC Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vessels for operation at high tension</td>
<td>H01J 5/06</td>
</tr>
</tbody>
</table>
**H01J 35/00**

X-ray tubes (X-ray lasers **H01S 4/00**; X-ray technique in general **H05G**, {e.g. apparatus or processes specially adapted for producing X-rays, not involving X-ray tubes, e.g. involving generation of a plasma **H05G 2/00**})

**Definition statement**

*This place covers:*

Vacuum tubes in which electrons hit a target (commonly termed "anode") in order to produce electromagnetic radiation caused by the deceleration of electrons (Bremsstrahlung) or a recombination of inner core holes (characteristic radiation).

All technical details of x-ray tubes, as long as these are situated inside the vacuum housing or an integral part of the housing (e.g. radiation transmissive windows).

**References**

**Limiting references**

*This place does not cover:*

Other means of producing x-rays, e.g. Synchrotron radiation, inverse Compton scattering etc. **H05G 2/00**

Producing x-rays from a hot plasma by recombinations inside the plasma **H05G 2/001**

**Informative references**

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Type</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-ray lasers</td>
<td><strong>H01S 4/00</strong></td>
</tr>
<tr>
<td>X-ray technique in general</td>
<td><strong>H05G</strong></td>
</tr>
<tr>
<td>Circuits providing power to x-ray tubes or otherwise driving it (&quot;x-ray generators&quot;)</td>
<td><strong>H05G 1/00</strong></td>
</tr>
</tbody>
</table>

**Special rules of classification**

To this group, Indexing Codes

- **H01J 2235/02** - **H01J 2235/0236**
- **H01J 2235/062** - **H01J 2235/068**
- **H01J 2235/081** - **H01J 2235/1295**
- **H01J 2235/161** - **H01J 2235/168** and
- **H01J 2235/183** - **H01J 2235/205**

are obligatory to be attributed as invention information for further details.

Indexing Codes

- **H01J 2235/06**
- **H01J 2235/08**
- **H01J 2235/16** and
may optionally be used for additional information.

**H01J 35/06**

Cathodes {(electron guns in general **H01J 3/02**)}

**References**

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Electrodes impacted by charged particles in order to produce X-rays.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-cathodes serving as windows</td>
</tr>
<tr>
<td>Target substrate interlayers</td>
</tr>
<tr>
<td>Transmission Targets</td>
</tr>
<tr>
<td>Laminated Targets</td>
</tr>
</tbody>
</table>

**H01J 35/05**

Field emission, photo emission or secondary emission cathodes

**Special rules of classification**

Emissive structures consisting of carbon nanotubes [CNT] are additionally covered by Indexing Code **H01J 2201/30446**.

**H01J 35/08**

Anodes; Anti cathodes {(anti-cathodes serving as windows **H01J 35/18**)}

**Definition statement**

This place covers:

Electrodes impacted by charged particles in order to produce X-rays.

**References**

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Electrodes impacted by charged particles in order to produce X-rays.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-cathodes serving as windows</td>
</tr>
<tr>
<td>Target substrate interlayers</td>
</tr>
<tr>
<td>Transmission Targets</td>
</tr>
<tr>
<td>Laminated Targets</td>
</tr>
</tbody>
</table>

**H01J 35/10**

Rotary anodes; Arrangements for rotating anodes; Cooling rotary anodes

**References**

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Electrodes impacted by charged particles in order to produce X-rays.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotating anode tubes in general</td>
</tr>
<tr>
<td>Cooling characterized by the method</td>
</tr>
</tbody>
</table>
### H01J 35/101

{Arrangements for rotating anodes, e.g. supporting means; greasing; sealing the axle; shielding or protecting the driving means}

#### References

**Informative references**

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Reference</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic pressure bearing</td>
<td>H01J 2235/106</td>
</tr>
<tr>
<td>Rotating shafts per se</td>
<td>F16C</td>
</tr>
</tbody>
</table>

### H01J 35/106

{Active cooling, e.g. fluid flow, heat pipes}

#### References

**Limiting references**

This place does not cover:

<table>
<thead>
<tr>
<th>Reference</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Techniques particularly adapted for cooling of a tube inside closed housing</td>
<td>H05G 1/04</td>
</tr>
</tbody>
</table>

### H01J 35/108

{Substrates for and bonding of emissive target, e.g. composite structures}

#### Definition statement

This place covers:

Substrates for rotating anode, such that the substrate requires an additional target layer; Details relating to the bonding of target to substrate e.g. using metallic interlayers

#### References

**Informative references**

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Reference</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target substrate interlayers</td>
<td>H01J 2235/084</td>
</tr>
<tr>
<td>Laminated Targets</td>
<td>H01J 2235/088</td>
</tr>
</tbody>
</table>
### H01J 35/12

**Cooling non-rotary anodes** \{(mounting the tube within a closed housing, e.g. for cooling purposes H05G 1/04)\}

**References**

**Informative references**

Attention is drawn to the following places, which may be of interest for search:

| Mounting the tube within a closed housing, e.g. for cooling purposes | H05G 1/04 |

### H01J 35/14

**Arrangements for concentrating, focusing, or directing the cathode ray** \{(for cathode ray tubes in general H01J 29/46)\}

**Definition statement**

This place covers:

Focusing of the electron beam, e.g. by magnetic means; directing and deflecting of the beam e.g. by electrostatic means; microfocus X-ray tubes

**References**

**Informative references**

Attention is drawn to the following places, which may be of interest for search:

| Arrangements for concentrating, focusing, or directing the cathode ray for cathode ray tubes in general | H01J 29/46 |
| X-ray tubes with Electrodes for controlling the current of the cathode ray, e.g. control grids | H01J 35/045 |

### H01J 35/16

**Vessels; Containers; Shields associated therewith** \{(vessels for high tension operation in general H01J 5/06; mounting the tube within a closed housing H05G 1/04)\}

**References**

**Informative references**

Attention is drawn to the following places, which may be of interest for search:

| Vessels for high tension operation in general | H01J 5/06 |
| Shields against charged particles | H01J 2235/168 |
| Mounting the tube within a closed housing | H05G 1/04 |
H01J 35/18
Windows

**Definition statement**

*This place covers:*

Structures transparent to X-rays but separating a space of certain properties, e.g. ambient pressure, from a space having different respective properties, e.g. low pressure, including windows acting as target anodes.

Further information:

Windows acting as target anodes are additionally covered by the Indexing Code H01J 2235/186.

H01J 35/20
Selection of substances for gas fillings; Means for obtaining or maintaining the desired pressure within the tube, e.g. by gettering {(for gas-discharge tubes in general H01J 7/02 - H01J 61/76; evacuating, filling, gettering in general H01J 9/38)}

**References**

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>For gas-discharge tubes in general</th>
<th>H01J 7/02 - H01J 61/76</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evacuating, filling, gettering in general</td>
<td>H01J 9/38</td>
</tr>
</tbody>
</table>

H01J 35/24
Tubes wherein the point of impact of the cathode ray on the anode or anticathode is movable relative to the surface thereof

**Definition statement**

*This place covers:*

Tubes in which said point of impact is movable, e.g.

to limit the local heat load on the anode by means of movement of the anode relative to the beam.

to obtain a variation in focal spot position, e.g. for oversampling.

H01J 35/26
**by rotation of the anode or anticathode**

**Definition statement**

*This place covers:*

Rotating anode tubes, i.e. tubes in which the anode rotates in operation, without affecting the position of the the x-ray source, in order to reduce the thermal load on the anode.
**References**

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Details on rotating anodes, cooling or mounting of rotating anodes</th>
</tr>
</thead>
<tbody>
<tr>
<td>H01J 35/10</td>
</tr>
</tbody>
</table>

**H01J 35/305**

*by using a rotating X-ray tube in conjunction therewith*

**Definition statement**

*This place covers:*

Tubes in which the point of generation of X-rays is fixed with respect to the laboratory frame, but not with respect to the vacuum housing of the tube, e.g. because it rotates with the anode.

**Further information:**

These tubes have been termed "rotary piston radiator" (resulting from a technically wrong translation of the german "Drehkolbenstrahler").

More recently, they are referred to as rotary bulb radiator or rotary envelope radiator.

**Example:** DE102004056110 (Fig 1)

---

**References**

*Limiting references*

*This place does not cover:*

<table>
<thead>
<tr>
<th>Anodes which rotate with respect to the vacuum envelope and details related to such anodes</th>
</tr>
</thead>
<tbody>
<tr>
<td>H01J 35/10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tubes in which the anode rotates with respect to the vacuum envelope</th>
</tr>
</thead>
<tbody>
<tr>
<td>H01J 35/26</td>
</tr>
</tbody>
</table>
**H01J 35/32**

Tubes wherein the X-rays are produced at or near the end of the tube or a part thereof which tube or part has a small cross-section to facilitate introduction into a small hole or cavity

**References**

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

| Radiation therapy | A61N 5/00 |

**H01J 37/00**

Discharge tubes with provision for introducing objects or material to be exposed to the discharge, e.g. for the purpose of examination or processing thereof (*H01J 33/00, H01J 40/00, H01J 41/00, H01J 47/00, H01J 49/00* take precedence; {scanning-probe techniques or apparatus *G01Q*} ; contactless testing of electronic circuits using electron beams *G01R 31/305*; {particle accelerators *H05H*})

**Definition statement**

*This place covers:*

Discharge tubes or details thereof, in which a sample, workpiece or similar object can be placed and removed that is exposed to a discharge (in the following "tubes") to be e.g. analysed or processed (in the following "analysis tubes" or "treatment tubes", respectively)

Typical "discharge tubes" covered by this main group are

- electron microscopes or ion microscopes
- spot analysers (i.e. systems with relatively large (larger than about 50-100nm) beam spots for Auger or particle beam induced X-ray analysis)
- focused ion beam instruments
- ion implanters
- electron or ion lithography systems (i.e. for producing latent images for future processing steps in resists)
- systems for working materials with electron or ion beams (e.g. electron beam welding or cutting or drilling or machining, e-beam evaporation, etc.)
- systems for plasma-treatment (e.g. plasma etching or deposition systems).

The "discharge" is usually in the form of a dedicated, possibly guided and/or focused beam (in the following "beam tubes") of charged particles or in the form of a plasma (in the following "plasma tubes") not forming a beam.

Typical energies of the particles in the discharge (e.g. electrons or ions in a beam) are in general below a few hundred keV.

Nevertheless, this group also covers ion implanters and ultra high energy electron microscopes (both with energies of up to several MeV).
Further information:

General Structure of the scheme **H01J 37/00**:

The scheme both for classes and indexing-codes is organised according to the following principle:

- Classes for details of the tube (sources, beam forming, sample holder etc.): **H01J 37/02 - H01J 37/248** and **H01J 2237/002 - H01J 2237/2487** ("details classes")
- Analysing or imaging: **H01J 37/252 - H01J 37/2955** and **H01J 2237/25 - H01J 2237/2857**
- Particle beam processing: **H01J 37/30 - H01J 37/3178** and **H01J 2237/30 - H01J 2237/31747**
- Processing with gas-filled tubes (plasma tubes): **H01J 37/32 - H01J 37/36** and **H01J 2237/32 - H01J 2237/339**

References

**Limiting references**

This place does not cover:

<table>
<thead>
<tr>
<th>Description</th>
<th>CPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge tubes with provision for emergence of electrons or ions from the</td>
<td>H01J 33/00</td>
</tr>
<tr>
<td>vessel; Lenard tubes</td>
<td></td>
</tr>
<tr>
<td>Photoelectric discharge tubes not involving the ionisation of a gas</td>
<td>H01J 40/00</td>
</tr>
<tr>
<td>Discharge tubes for measuring pressure of introduced gas or for detecting</td>
<td>H01J 41/00</td>
</tr>
<tr>
<td>presence of gas; Discharge tubes for evacuation by diffusion of ions</td>
<td></td>
</tr>
<tr>
<td>Tubes for determining the presence, intensity, density or energy of</td>
<td>H01J 47/00</td>
</tr>
<tr>
<td>radiation or particles</td>
<td></td>
</tr>
<tr>
<td>Particle spectrometer or separator tubes (in particular mass spectrometers)</td>
<td>H01J 49/00</td>
</tr>
<tr>
<td>Scanning tunnelling microscopes</td>
<td>G01Q 60/10</td>
</tr>
<tr>
<td>X-ray microscopes wherein a (sub)-nanometre sized x-ray source is generated</td>
<td>G21K 7/00</td>
</tr>
<tr>
<td>in an SEM-like apparatus by focusing an electron probe onto an x-ray</td>
<td></td>
</tr>
<tr>
<td>transmissive target (cf. e.g. EP1557864)</td>
<td></td>
</tr>
</tbody>
</table>

**Informative references**

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Description</th>
<th>CPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>General purpose ion sources</td>
<td>H01J 27/00</td>
</tr>
<tr>
<td>Sterilising by irradiation (depending on the sterilised product)</td>
<td>A61L 2/087, B65B 55/08,</td>
</tr>
<tr>
<td></td>
<td>A23L 3/263</td>
</tr>
<tr>
<td>Coating by physical vapour deposition (PVD) such as vacuum evaporation,</td>
<td>C23C 14/00</td>
</tr>
<tr>
<td>sputtering or ion implantation of the coating forming material</td>
<td></td>
</tr>
<tr>
<td>Chemical vapour deposition (CVD) processes</td>
<td>C23C 16/00</td>
</tr>
<tr>
<td>Measuring i.a. length</td>
<td>G01C</td>
</tr>
<tr>
<td>Preparation of specimen for investigation</td>
<td>G01N 1/00</td>
</tr>
<tr>
<td>Determining chemical or physical properties of materials by investigating</td>
<td>G01N 23/00</td>
</tr>
<tr>
<td>or analysing by the use of wave or particle radiation</td>
<td></td>
</tr>
<tr>
<td>Scanning probe techniques</td>
<td>G01Q</td>
</tr>
<tr>
<td>Contactless testing using electron beams of electronic circuits and of</td>
<td>G01R 31/305 and</td>
</tr>
<tr>
<td>individual semiconductor devices, respectively</td>
<td>G01R 31/2653</td>
</tr>
<tr>
<td>Category</td>
<td>Code</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Measurement of nuclear or x-radiation</td>
<td>G01T</td>
</tr>
<tr>
<td>Light optics</td>
<td>G02B</td>
</tr>
<tr>
<td>Light optical microscopes</td>
<td>G02B 21/00</td>
</tr>
<tr>
<td>Lithography</td>
<td>G03F 1/00</td>
</tr>
<tr>
<td>Holographic processes or apparatus using particles</td>
<td>G03H 5/00</td>
</tr>
<tr>
<td>Sensing record carriers by corpuscular radiation</td>
<td>G06K 7/10</td>
</tr>
<tr>
<td>Techniques for handling particles or ionising radiation not otherwise provided for</td>
<td>G21K 1/00 - G21K 5/10</td>
</tr>
<tr>
<td>Irradiation devices</td>
<td>G21K 5/00</td>
</tr>
<tr>
<td>Semiconductor devices</td>
<td>H01L</td>
</tr>
<tr>
<td>Manufacture of semiconductor devices by ion implantation</td>
<td>H01L 21/265</td>
</tr>
<tr>
<td>Testing of semiconductor devices during manufacture</td>
<td>H01L21/66</td>
</tr>
<tr>
<td>Modifying the pattern of conductors of semiconductor devices</td>
<td>H01L 21/76892</td>
</tr>
<tr>
<td>Pumping lasers i.a. by electron beams</td>
<td>H01S 3/0959, H01S 5/04</td>
</tr>
<tr>
<td>Apparatus for generating ions to be introduced into non-enclosed gases, e.g. into the atmosphere</td>
<td>H01T 23/00</td>
</tr>
<tr>
<td>Plasma Technique and particle accelerators; in particular as indicated in the following:</td>
<td>H05H</td>
</tr>
<tr>
<td>Generating plasma; Handling plasma</td>
<td>H05H 1/00</td>
</tr>
<tr>
<td>Targets, e.g. pellets for fusion reactions by i.a. charged particles beam injection</td>
<td>H05H 1/22</td>
</tr>
<tr>
<td>Production or acceleration of neutral particle beams</td>
<td>H05H 3/00</td>
</tr>
<tr>
<td>Direct voltage accelerators; Accelerators using single pulses</td>
<td>H05H 5/00</td>
</tr>
<tr>
<td>Targets for producing nuclear reactions</td>
<td>H05H 6/00</td>
</tr>
<tr>
<td>Details of devices in <strong>H05H 9/00, H05H 11/00, H05H 13/00</strong></td>
<td>H05H 7/00</td>
</tr>
<tr>
<td>Linear accelerators</td>
<td>H05H 9/00</td>
</tr>
<tr>
<td>Magnetic induction accelerators, e.g. betatrons</td>
<td>H05H 11/00</td>
</tr>
<tr>
<td>Magnetic resonance accelerators; Cyclotrons</td>
<td>H05H 13/00</td>
</tr>
<tr>
<td>Methods or devices for acceleration of charged particles not otherwise provided for</td>
<td>H05H 15/00</td>
</tr>
</tbody>
</table>

**Special rules of classification**

Documents should usually be classified in all applicable categories:

If a document concerns embodiments or elements in detail which are covered by several subgroups dependent on a higher hierarchy group, the relevant information is classified in all the respective subgroups (example: a document concerning both ion sources and lenses is classified in **H01J 37/08** and in **H01J 37/10**, not in the higher group **H01J 37/04**).

The higher hierarchy group is to be used

if no respective subgroup exists

if the general idea is relevant for the higher hierarchy as well as all the respective subgroups

(example: a specific construction valid for all types of beam deflection is not classified in all the lower...
subgroups of H01J 37/147 but in H01J 37/147, but Indexing Codes under H01J 2237/00 should be given for the (most important) embodiments)

If a document relates to a detail for which a group in H01J 37/02 - H01J 37/248 exists, this is classified there if none of the two following precedence rules applies:

• generating/controlling the discharge is classified in H01J 37/04 and subgroups, unless [entire] optical systems of treatment tubes are concerned, which are classified in H01J 37/3007
• specific details for plasma tubes are usually considerably different from those of beam tubes and are classified in the subgroups of H01J 37/32 - if they are not of general interest for H01J 37/00, e.g. if relevant for different types of tubes.

If the classified detail is specific for a certain type or for certain types of tubes, then this tube type(s) should be classified with the appropriate symbol in either H01J 37/00 or H01J 2237/00, depending on the specificity.

For example:

A document discloses and claims a particular construction of an objective lens specifically in a scanning electron microscope and generally states that this lens could be employed also for all other types of charged particle beam instruments like transmission electron microscopes, focused ion beam systems and ion implanters. The document is classified in the appropriate subgroup in H01J 37/10 (lens) and in H01J 37/28 (SEM), it is however not classified in view of TEM, FIB or ion implanters because lenses for these systems are usually considerably different.

Invention information is classified in the respective symbol under H01J 37/00; Indexing Codes under H01J 2237/00 are to be given where they provide additional aspects or provide for a more detailed subdivision.

For example:

A document concerns details of the construction of a gas field ion source specifically in a FIB-microworking device. This document is classified in H01J 37/08 (ion sources) and H01J 37/3056 (microworking). It is further classified in H01J 2237/061 (construction of source) and H01J 2237/0807 (gas field ion source).

Additional (non-invention information) is classified with symbol under H01J 37/00 and/or Indexing Codes, if it is relevant for search:If a certain (non-claimed) feature is described in particular detail, it should be classified similar to invention information. If a combination of features is described which goes beyond what is implicit to a certain device or only minor but still search-relevant information is given on the particular feature, said features should be classified with respective Indexing Code(s).

For example: For the claimed construction of the gas field ion source in the FIB-system of the above example, in addition, also a known construction of a very fast beam blanker is described in detail which works particularly well with the inventive source. Then the symbol for the beam blanker H01J 37/045 and the Indexing Code H01J 2237/0432 (high speed beam blanking) should be given in addition.

Reminder in view of the structure of subclass H01J as a whole:

Rules for classification regarding H01J for general elements:

As it is the case in H01J in general, for elements of general type which may be found in other types of discharge tubes, a class corresponding to general schemes H01J 1/00 - H01J 7/00 is given, e.g. for cathodes, vessels, cooling means or the like. Same rules apply for manufacturing procedures (H01J 9/00), unless specific to the tube concerned (as however elements for the tubes covered by H01J 37/00 are usually very specific, this seldom applies).
Synonyms and Keywords

In patent documents, the following abbreviations are often used:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEM</td>
<td>scanning electron microscope</td>
</tr>
<tr>
<td>REM</td>
<td>Rasterelektronenmikrokop (German acronym for &quot;SEM&quot;)</td>
</tr>
<tr>
<td>TEM</td>
<td>transmission electron microscope</td>
</tr>
<tr>
<td>STEM</td>
<td>scanning transmission electron microscope</td>
</tr>
<tr>
<td>FIB</td>
<td>focused ion beam</td>
</tr>
<tr>
<td>LMIS</td>
<td>liquid metal ion source</td>
</tr>
<tr>
<td>GFIS</td>
<td>gas field ion source</td>
</tr>
</tbody>
</table>

H01J 37/02

Details

Definition statement

This place covers:

Details for all types of tubes in H01J 37/00; the respective documents regarding the tube, i.e. for analysis tubes and processing tubes, beam tubes, etc. and plasma tubes of general interest for H01J 37/00, are classified in the subgroup covering the respective detail.

H01J 37/023

{Means for mechanically adjusting components not otherwise provided for (mechanically adjusting from the outside of electron or ion-optical components H01J 37/067; positioning the object or material H01J 37/20; vacuum locks, means for obtaining or maintaining the desired pressure within the tube H01J 37/18; other manipulating devices H01L 21/48, G21F)}

References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Description</th>
<th>CPC Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanically adjusting from the outside of electron or ion-optical components</td>
<td>H01J 37/067</td>
</tr>
<tr>
<td>Positioning the object or material</td>
<td>H01J 37/20</td>
</tr>
</tbody>
</table>

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Description</th>
<th>CPC Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vacuum locks, means for obtaining or maintaining the desired pressure within the tube</td>
<td>H01J 37/18</td>
</tr>
<tr>
<td>Other manipulating devices</td>
<td>H01L 21/48, G21F/00</td>
</tr>
</tbody>
</table>
H01J 37/026
{Means for avoiding or neutralising unwanted electrical charges on tube components}

Definition statement
This place covers:
• means for avoiding or neutralising unwanted electrical charges on the sample or in the beam

H01J 37/04
Arrangements of electrodes and associated parts for generating or controlling the discharge, e.g. electron-optical arrangement, ion-optical arrangement {(electron or ion-optical systems for localised treatment of materials H01J 37/3007: discharge control means in gas filled discharge tubes H01J 37/32009)}

Definition statement
This place covers:
Ion-optical systems only of tubes of the types in H01J 37/252-H01J 37/2955 (analysis/beam tubes) or details for which no class specific subclass is provided below

References
Limiting references
This place does not cover:

<table>
<thead>
<tr>
<th>Electron or ion-optical systems for localised treatment of materials</th>
<th>H01J 37/3007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge control means in gas filled discharge tubes</td>
<td>H01J 37/32623, H01J 37/3266, H01J 37/32697</td>
</tr>
</tbody>
</table>

H01J 37/05
Electron or ion-optical arrangements for separating electrons or ions according to their energy (or mass) (particle separator tubes H01J 49/00)

References
Limiting references
This place does not cover:

| Particle separator tubes | H01J 49/00 |
**H01J 37/06**

Electron sources; Electron guns { (electron sources in general H01J 1/02, H01J 19/02; electron guns in general H01J 3/02) }

**References**

**Informative references**

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Electron sources in general</th>
<th>H01J 1/02, H01J 19/02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electron guns in general</td>
<td>H01J 3/02</td>
</tr>
</tbody>
</table>

**H01J 37/063**

Geometrical arrangement of electrodes for beam-forming

**Definition statement**

This place covers:

Schematic construction, arrangement of potential or fields or voltages; more related to the functioning of the source rather than the specific "hardware" construction

**H01J 37/065**

Construction of guns or parts thereof (H01J 37/067 - H01J 37/077 take precedence)

**Definition statement**

This place covers:

Physical construction, "hardware oriented" (e.g. mechanical construction, contact arrangements)

**References**

**Limiting references**

This place does not cover:

<table>
<thead>
<tr>
<th>Replacing parts of guns; Mutual adjustment of electrodes</th>
<th>H01J 37/067</th>
</tr>
</thead>
<tbody>
<tr>
<td>eliminating deleterious effects due to thermal effects or electric or magnetic fields</td>
<td>H01J 37/07</td>
</tr>
<tr>
<td>Electron guns using field emission, photo emission, or secondary emission electron sources</td>
<td>H01J 37/073</td>
</tr>
<tr>
<td>Electron guns using thermionic emission from cathodes heated by particle bombardment or by irradiation, e.g. by laser</td>
<td>H01J 37/075</td>
</tr>
<tr>
<td>Electron guns using discharge in gases or vapours as electron sources</td>
<td>H01J 37/077</td>
</tr>
</tbody>
</table>
H01J 37/067
Replacing parts of guns; Mutual adjustment of electrodes
(H01J 37/073 - H01J 37/077 take precedence; vacuum locks H01J 37/18)

References
Limiting references
This place does not cover:

<table>
<thead>
<tr>
<th>Type of Gun</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electron guns using field emission, photo emission, or secondary emission electron sources</td>
<td>H01J 37/073</td>
</tr>
<tr>
<td>Electron guns using thermionic emission from cathodes heated by particle bombardment or by irradiation, e.g. by laser</td>
<td>H01J 37/075</td>
</tr>
<tr>
<td>Electron guns using discharge in gases or vapours as electron sources</td>
<td>H01J 37/077</td>
</tr>
<tr>
<td>Vacuum locks</td>
<td>H01J 37/18</td>
</tr>
</tbody>
</table>

H01J 37/07
Eliminating deleterious effects due to thermal effects or electric or magnetic fields (H01J 37/073 - H01J 37/077 take precedence)

References
Limiting references
This place does not cover:

<table>
<thead>
<tr>
<th>Type of Gun</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electron guns using field emission, photo emission, or secondary emission electron sources</td>
<td>H01J 37/073</td>
</tr>
<tr>
<td>Electron guns using thermionic emission from cathodes heated by particle bombardment or by irradiation, e.g. by laser</td>
<td>H01J 37/075</td>
</tr>
<tr>
<td>Electron guns using discharge in gases or vapours as electron sources</td>
<td>H01J 37/077</td>
</tr>
</tbody>
</table>

H01J 37/10
Lenses

Definition statement
This place covers:
only the lenses themselves

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Type of Arrangement</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electron/ion optical arrangements</td>
<td>H01J 37/04, H01J 37/3007</td>
</tr>
</tbody>
</table>
H01J 37/1413
{Means for interchanging parts of the lens, e.g. pole pieces, within the tube (mechanically adjusting electron (ion) optical components H01J 37/15)}

References

Limiting references
This place does not cover:

Mechanically adjusting electron (ion) optical components  H01J 37/15

H01J 37/147

Arrangements for directing or deflecting the discharge along a desired path (H01J 37/045 takes precedence ; lenses H01J 37/10)

References

Limiting references
This place does not cover:

Beam blanking or chopping, i.e. arrangements for momentarily interrupting exposure to the discharge  H01J 37/045

Informative references
Attention is drawn to the following places, which may be of interest for search:

Lenses  H01J 37/10

H01J 37/15

External mechanical adjustment of electron or ion optical components (H01J 37/067, H01J 37/20 take precedence)

References

Limiting references
This place does not cover:

Replacing parts of guns; Mutual adjustment of electrodes  H01J 37/067

Means for supporting or positioning the objects or the material; Means for adjusting diaphragms or lenses associated with the support  H01J 37/20
**H01J 37/18**

Vacuum locks \{; Means for obtaining or maintaining the desired pressure within the vessel (vacuum locks for electron-beam tubes in general H01J 29/865)\}

**Definition statement**

This place covers:

everything associated with generating, maintaining, etc., vacuum (e.g. pumps, valves) as long as in connection with the tube

**References**

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

| Vacuum locks for electron-beam tubes in general | H01J 29/865 |

**H01J 37/20**

Means for supporting or positioning the objects or the material; Means for adjusting diaphragms or lenses associated with the support \{ (introducing the objects H01J 37/18; preparing specimens for investigation G01N 1/06, G01N 1/28)\}

**References**

*Limiting references*

This place does not cover:

| Introducing the objects | H01J 37/18 |

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Preparing specimens for investigation</th>
<th>G01N 1/06, G01N 1/28</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apparatus specially adapted for handling wafers during manufacture or treatment of semiconductor or electronic solid state devices or components</td>
<td>H01L 21/67</td>
</tr>
</tbody>
</table>

**H01J 37/21**

Means for adjusting the focus \{ (adjusting the focus while observing the image by photographic or optical means H01J 37/22; means for observing the object or the point of impact on the object in tubes for the localised treatment of materials H01J 37/3005)\}

**Definition statement**

This place covers:

Means and methods for automatic focusing
References

Limiting references

This place does not cover:

| Adjusting the focus while observing the image by photographic or optical means | H01J 37/22 |

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Means for observing the object or the point of impact on the object in tubes for the localised treatment of materials | H01J 37/3005 |
| Optical elements, systems or apparatus per se | G02B |

H01J 37/22

Optical or photographic arrangements associated with the tube \{(using a CRT for the display of the image in a scanning electron microscope H01J 37/28; observing the object or the point of impact on the object in tubes for the localised treatment of materials H01J 37/3007)\}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Using a CRT for the display of the image in a scanning electron microscope | H01J 37/28 |
| Observing the object or the point of impact on the object in tubes for the localised treatment of materials | H01J 37/3007 |
| Optical elements, systems or apparatus per se | G02B |

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Optical in this subgroup relates to light-optical

H01J 37/222

{Image processing arrangements associated with the tube (image data processing or generation, in general G06T)}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Image data processing or generation specially adapted for particular applications, see the relevant subclass | G06K, G09G, H04N |
| Image data processing or generation, in general | G06T |
| Geometric image transformation for image mosaicing | G06T 3/4038 |
H01J 37/241
{High voltage power supply or regulation circuits (components H01J 37/248)}

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Components associated with high voltage supply | H01J 37/248 |

H01J 37/242
{Filament heating power supply or regulation circuits (H01J 37/241 takes precedence)}

References
Limiting references
This place does not cover:

| High voltage power supply or regulation circuits | H01J 37/241 |

H01J 37/243
{Beam current control or regulation circuits (H01J 37/241 takes precedence)}

References
Limiting references
This place does not cover:

| High voltage power supply or regulation circuits | H01J 37/241 |

H01J 37/244
Detectors; Associated components or circuits therefor (detectors per se G01T)

References
Limiting references
This place does not cover:

| Detectors per se | G01T |
H01J 37/248
Components associated with high voltage supply ({Means for measuring the high voltage per se G01R 15/00} ; high voltage supply per se H02J, H02M)

References
Limiting references
This place does not cover:

| Means for measuring the high voltage per se | G01R 15/00 |
| High voltage supply per se                 | H02J, H02M |

H01J 37/252
Tubes for spot-analysing by electron or ion beams; Microanalysers (investigating or analysing thereby G01N 23/22)

Definition statement
This place covers:
Beam tubes that do not deliver "spatial images" based on secondary and backscattered electrons, but based on other beam-induced information like e.g. Auger-electrons or X-rays - leading e.g. rather to material contrast (today mainly attachments or subsystems of electron microscopes rather than dedicated microanalysers)

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Investigating or analysing with tubes for spot-analysing by electron or ion beams | G01N 23/22 |

H01J 37/256
using scanning beams

Definition statement
This place covers:
Further information:

"Spot analysis" in scanning electron or ion microscopes (in contrast to dedicated spot- or microanalysers) is classified H01J 37/28 and should in respective situations in addition be classified in H01J 37/256 or a respective indexing-code depending on the degree of specific adaption of the overall system
H01J 37/26
Electron or ion microscopes; Electron or ion diffraction tubes

Definition statement
This place covers:
Transmission Electron Microscopes

References
Limiting references
This place does not cover:

| Scanning Electron Microscopes | H01J 37/28 |

Informative references
Attention is drawn to the following places, which may be of interest for search:

| Scanning probe techniques | G01Q |

Special rules of classification
Scanning Electron Microscopes are covered by in H01J 37/28, also Scanning Transmission Microscopes are covered by H01J 37/28 with Indexing Code H01J 2237/2802

H01J 37/261
{Details}

Definition statement
This place covers:
Details (not covered by the "Details"-classes H01J 37/02 and below) specific to electron or ion microscopes (both scanning and non-scanning)

H01J 37/266
{Measurement of magnetic- or electric fields in the object; Lorentzmicroscopy (emission microscopes H01J 37/285; reflecting microscopes H01J 37/29; spot analysing H01J 37/252)}

References
Limiting references
This place does not cover:

| Spot analysing          | H01J 37/252 |
| Emission microscopes    | H01J 37/285 |
| Reflecting microscopes  | H01J 37/29  |
H01J 37/28

with scanning beams (\{H01J 37/268, H01J 37/292, H01J 37/295\} take precedence ; microanalysers using scanning beams \textbf{H01J 37/256})

References

Limiting references

This place does not cover:

| Microanalysers using scanning beams | H01J 37/256 |
| Measurement of magnetic- or electric fields in the object; Lorentzmicroscopy with scanning beams | H01J 37/268 |
| Reflection microscopes using scanning ray | H01J 37/292 |
| Electron or ion diffraction tubes using scanning ray | H01J 37/295 |

H01J 37/285

Emission microscopes, e.g. field-emission microscopes

Definition statement

This place covers:
also so-called "atom probes"

H01J 37/295

Electron or ion diffraction tubes

Definition statement

This place covers:
also spin analysers

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Electron or ion-optical details | H01J 37/06 - H01J 37/153 |

H01J 37/3002

{Details}

Definition statement

This place covers:
Details (which are not covered by the "Details"-classes H01J 37/02 and below) specific to beam treatment tubes
**H01J 37/3007**

{Electron or ion-optical systems (electron or ion-optical details H01J 37/06 - H01J 37/153)}

**References**

**Limiting references**

*This place does not cover:*

| Ion optical systems for analysis tubes | H01J 37/04 |

**Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

| Electron or ion-optical details | H01J 37/06 - H01J 37/153 |

**H01J 37/302**

Controlling tubes by external information, e.g. programme control (**H01J 37/304** takes precedence)

**References**

**Limiting references**

*This place does not cover:*

| Controlling tubes by information coming from the objects or from the beam, e.g. correction signals | H01J 37/304 |

**H01J 37/305**

for casting, melting, evaporating or etching {(methods for casting or melting of metals with electron beam or gas discharges **C22B 9/22**)}

**References**

**Limiting references**

*This place does not cover:*

| Methods for casting or melting of metals with electron beam or gas discharges | C22B 9/22 |
### H01J 37/3053

(for evaporating or etching)

**References**

**Informative references**

Attention is drawn to the following places, which may be of interest for search:

| Methods for evaporating metals with electron beams | C23C 14/30 |

### H01J 37/3056

(for microworking, e.g. etching of gratings, trimming of electrical components (trimming of resistors H01C 17/22))

**Definition statement**

This place covers:

also for cutting / depositing by focussed ion beam, e.g. for fabrication of MEMS (microelectro mechanical systems))

**References**

**Informative references**

Attention is drawn to the following places, which may be of interest for search:

| Processes or apparatus specially adapted for the manufacture or treatment of microstructural devices or systems, e.g. MEMS | B81C |
| Trimming of resistors | H01C 17/22 |

### H01J 37/31

for cutting or drilling {(methods for cutting or drilling metals with electron beams B23K 15/00)}

**References**

**Limiting references**

This place does not cover:

| Methods for cutting or drilling metals with electron beams | B23K 15/00 |

### H01J 37/315

for welding {(methods for welding metals with electron beams B23K 15/00)}

**References**

**Limiting references**

This place does not cover:

| Methods for welding metals with electron beams | B23K 15/00 |
H01J 37/317
for changing properties of the objects or for applying thin layers thereon, e.g.
for ion implantation (H01J 37/36 takes precedence)

References
Limiting references
This place does not cover:

| Gas-filled discharge tubes | H01J 37/36 |

H01J 37/3171
{for ion implantation (plasma immersion ion implantation H01J 37/32412)}

References
Limiting references
This place does not cover:

| Plasma immersion ion implantation | H01J 37/32412 |

H01J 37/3174
{Particle-beam lithography, e.g. electron beam lithography}

References
Limiting references
This place does not cover:

| Masks, i.e. mask manufacture, inspection, cleaning, repair | G03F 1/00 |

Informative references
Attention is drawn to the following places, which may be of interest for search:

| Electron or ion microscopes | H01J 37/26 |
| Stereolithography, i.e. manufacturing of 3D objects | B29C 64/00 |
| Hydrostatic bearings | F16C 29/025 |
| Magnetic or electric bearings | F16C 32/04 |
| Vibrations dampers | F16F 9/00 |
| Measuring by electric or magnetic means | G01B 7/00 |
| Interferometers | G01B 9/02 |
| Measuring by optical means (e.g. for alignment) | G01B 11/00 |
| Measuring optical phase differences | G01J 9/00 |
| Inspection by optical means | G01N 21/00 |
| Measuring electric or magnetic variables | G01R |
| Measuring ionising radiation | G01T 1/00 |
Microscopes

Originals (masks)

Lithography applications (e.g. holography, imprint)

Resists

Exposure

Photolithography, e.g. high resolution photolithography

Exposure strategies

Mask-workpiece alignment in photolithography

Control and regulating systems

Lithographic production of optical disks

Testing of semiconductor devices during manufacture

Workpiece handling

Apparatus for manufacturing or treating semiconductors not provided elsewhere

Marks on workpieces (e.g. alignment marks)

Linear motors

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>electron</td>
</tr>
<tr>
<td>E beam, e-beam</td>
<td>electron beam</td>
</tr>
</tbody>
</table>

H01J 37/32

Gas-filled discharge tubes, {e.g. for surface treatment of objects such as coating, plating, etching, sterilising or bringing about chemical reactions} {(general methods or devices for heat treatments of ferrous or non-ferrous metals or alloys by cathodic discharges C21D 1/38; methods of carburising or nitriding of metals in general C23C 8/00; methods for coating, plating or surface treating of or with metallic material C23C 8/36, C23C 14/32, C23C 16/50; methods for coating, plating or surface treating of or with semiconductors H01L 21/00; } heating by discharge H05B

Definition statement

This place covers:

Gas filled discharge tubes for plasma processing.

The different aspects covered by this group are:

- production of plasma; e.g. RF or microwave plasma sources;
- constructional aspects (hardware) of the apparatus;
- operating strategies, e.g. remote plasma generation, specific treatments such as localised processing or treating interior parts of workpieces;
- testing and control of the apparatus; e.g. gas control, generation of magnetic or electrostatic fields for controlling the plasma, process monitoring;
• arrangement, mounting, housing, environment, cleaning or maintenance of the apparatus;
• cathodic sputtering systems; cleaning surfaces while plating with ions of materials introduced into
  the discharge.

References

**Limiting references**

*This place does not cover:*

<table>
<thead>
<tr>
<th>Topic</th>
<th>CPC Classifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical coating processes using plasma</td>
<td>C23C 8/36; C23C 14/24; C23C 14/34; C23C 14/35; C23C 16/50</td>
</tr>
<tr>
<td>Treatment of semiconductors</td>
<td>H01L 21/30; H01L 21/46</td>
</tr>
<tr>
<td>Plasma generation</td>
<td>H05H 1/24</td>
</tr>
<tr>
<td>Plasma torches</td>
<td>H05H 1/42</td>
</tr>
<tr>
<td>Plasma generation using high frequency or microwaves</td>
<td>H05H 1/46</td>
</tr>
</tbody>
</table>

**Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

<table>
<thead>
<tr>
<th>Topic</th>
<th>CPC Classifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vacuum locks</td>
<td>H01J 37/18</td>
</tr>
<tr>
<td>Means for introducing or removing gases</td>
<td>C23C 14/0063</td>
</tr>
<tr>
<td>Coating cavities or hollow spaces, e.g. interior of tubes</td>
<td>C23C 14/046</td>
</tr>
<tr>
<td>Substrate holders</td>
<td>C23C 14/50</td>
</tr>
<tr>
<td>Coating cavities or hollow spaces, e.g. interior of tubes</td>
<td>C23C 16/045</td>
</tr>
<tr>
<td>Surface treatment on the inside of the reaction chamber</td>
<td>C23C 16/4404</td>
</tr>
<tr>
<td>Cleaning of reactor or parts inside the reactor by using reactive gases</td>
<td>C23C 16/4405</td>
</tr>
<tr>
<td>Introducing gases into reaction chamber or for modifying gas flows in reaction chamber</td>
<td>C23C 16/455</td>
</tr>
<tr>
<td>Supporting substrates in the reaction chamber</td>
<td>C23C 16/458</td>
</tr>
<tr>
<td>Elements in the interior of the support, e.g. electrodes, heating or cooling device</td>
<td>C23C 16/4586</td>
</tr>
<tr>
<td>Hydrostatic bearings</td>
<td>F16C 29/025</td>
</tr>
<tr>
<td>Magnetic or electric bearings</td>
<td>F16C 32/04</td>
</tr>
<tr>
<td>Vibrations dampers</td>
<td>F16F 9/00</td>
</tr>
<tr>
<td>Measuring by electric or magnetic means</td>
<td>G01B 7/00</td>
</tr>
<tr>
<td>Measuring by optical means</td>
<td>G01B 11/00</td>
</tr>
<tr>
<td>Measuring optical phase differences</td>
<td>G01J 9/00</td>
</tr>
<tr>
<td>Inspection by optical means</td>
<td>G01N 21/00</td>
</tr>
<tr>
<td>Measuring electric or magnetic variables</td>
<td>G01R</td>
</tr>
<tr>
<td>Measuring ionising radiation</td>
<td>G01T 1/00</td>
</tr>
<tr>
<td>Microscopes</td>
<td>G02B 21/00</td>
</tr>
<tr>
<td>Originals (masks)</td>
<td>G03F 1/00</td>
</tr>
<tr>
<td>Resists</td>
<td>G03F 7/004 - G03F 7/18</td>
</tr>
<tr>
<td>Exposure</td>
<td>G03F 7/20 - G03F 7/2065</td>
</tr>
</tbody>
</table>
High resolution photolithography
Control and regulating systems
Treatment of semiconductors
Plasma doping
Testing or measuring during manufacturing of semiconductor devices
Workpiece handling
Apparatus for manufacturing or treating semiconductors not provided elsewhere
Apparatus for etching
Apparatus with a plurality of work-stations
Loadlocks
Linear motors
Impedance-matching networks
Matching of load impedance to source impedance
Plasma generation
Plasma torches
Plasma generation using high frequency or microwaves

Special rules of classification

The documents related to plasma processing in general should be classified in the relevant H01J 37/32009-H01J 37/32917 subgroups and not in H01J 37/32.

The documents related to cathodic sputtering should be classified in the relevant H01J 37/3402-H01J 37/3476 subgroups and possibly also in H01J 37/34 if they relate to non-magnetron cathodic sputtering. General plasma processing aspects (e.g. gas control or material of the vessel) of documents related to cathodic sputtering should be classified in the relevant H01J 37/32009-H01J 37/32917 subgroups.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

<table>
<thead>
<tr>
<th>Term</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td>alternating current</td>
</tr>
<tr>
<td>DC</td>
<td>direct current</td>
</tr>
<tr>
<td>HF</td>
<td>high frequency</td>
</tr>
<tr>
<td>HIPIMS</td>
<td>high impulse power magnetron sputtering</td>
</tr>
<tr>
<td>RF</td>
<td>radio frequency</td>
</tr>
<tr>
<td>VHF</td>
<td>very high frequency</td>
</tr>
</tbody>
</table>

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

<table>
<thead>
<tr>
<th>Term</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECR</td>
<td>electron cyclotron resonance</td>
</tr>
<tr>
<td>HIPIMS</td>
<td>high impulse power magnetron sputtering</td>
</tr>
<tr>
<td>PIII</td>
<td>plasma immersion ion implantation</td>
</tr>
</tbody>
</table>
Operating with cathodic sputtering (H01J 37/36 takes precedence; methods of cathodic sputtering C23C 14/34)

References

Limiting references
This place does not cover:

Cleaning surfaces while plating with ions of materials introduced into the discharge

Informative references
Attention is drawn to the following places, which may be of interest for search:

Methods of cathodic sputtering

H01J 37/36

for cleaning surfaces while plating with ions of materials introduced into the discharge, e.g. introduced by evaporation ((condensing of electrically charged vapour onto a surface for covering materials with metals C23C 14/32))

References

Informative references
Attention is drawn to the following places, which may be of interest for search:

Condensing of electrically charged vapour onto a surface for covering materials with metals

C23C 14/32

H01J 40/00

Photoelectric discharge tubes not involving the ionisation of a gas (H01J 49/00 takes precedence; cathode-ray or image-pick-up tubes H01J 31/26)

Definition statement
This place covers:
Electric discharge tubes comprising essentially only a photo-cathode and a detector

References

Limiting references
This place does not cover:

Photo-emissive cathodes per se

H01J 1/34
Image pick-up cathode ray tubes having an input of visible light and electric output

Electron-multiplier tubes

Ionisation chamber tubes for determining the presence, intensity, density or energy of radiation or particles

Particle spectrometer or separator tubes

Informative references

Attention is drawn to the following places, which may be of interest for search:

Solid-state photodiodes, i.e. semiconductor devices sensitive to infrared radiation, light, electromagnetic radiation of shorter wavelength or corpuscular radiation and adapted either for the conversion of the energy of such radiation into electrical energy or for the control of electrical energy by such radiation

H01J 40/16

having photo- emissive cathode, e.g. alkaline photoelectric cell (operating with secondary emission H01J 43/00)

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

photo- emissive cathode operating with secondary emission H01J 43/00

H01J 40/18

with luminescent coatings for influencing the sensitivity of the tube, e.g. by converting the input wavelength (image-conversion or image-amplification tubes H01J 31/50)

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Image-conversion or image-amplification tubes H01J 31/50

H01J 41/00

Discharge tubes for measuring pressure of introduced gas (or for detecting presence of gas); Discharge tubes for evacuation by diffusion of ions

Definition statement

This place covers:

Electric discharge tubes wherein the discharge is used either for measuring the residual gas pressure (ionisation vacuum gauges), or for evacuating by diffusion of ions (ion pumps)
References

Limiting references

This place does not cover:

| Means for absorbing or adsorbing gas, e.g. by gettering, common to two or more basic types of discharge tubes | H01J 7/18 |
| Means for obtaining or maintaining the desired pressure within gas-filled discharge tubes with solid cathode | H01J 17/22 |

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Mechanical pumps for fluids | F04 |
| Vacuum gauges by making use of ionisation effects | G01L 21/30 |

H01J 43/00

Secondary-emission tubes; Electron-multiplier tubes (dynamic electron-multiplier tubes H01J 25/76; secondary-emission detectors for measurement of nuclear or X-radiation G01T 1/28)

Definition statement

This place covers:

Electric discharge tubes comprising secondary-electron emitting electrodes

References

Limiting references

This place does not cover:

| Secondary-electron-emitting electrodes | H01J 1/32 |
| Manufacture of secondary-emission electrodes | H01J 9/125 |
| Dynamic electron-multiplier tubes | H01J 25/76 |
| Secondary-electron emitting electrode arrangements in cathode ray tubes | H01J 29/023 |
| Measuring radiation intensity with secondary-emission detectors | G01T 1/28 |

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

| Image-conversion or image-amplification cathode ray tubes | H01J 31/50 |

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Computerised tomographs | A61B 6/03 |
| Avalanche photodiodes | H01L 31/107 |
Synonyms and Keywords

In patent documents, the following abbreviations are often used:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMT</td>
<td>Electron Multiplier Tube</td>
</tr>
<tr>
<td>MCP</td>
<td>Microchannel Plate</td>
</tr>
<tr>
<td>PMT</td>
<td>Photomultiplier Tube</td>
</tr>
</tbody>
</table>

H01J 45/00

Discharge tubes functioning as thermionic generators {(structural combination of fuel element with thermoelectric element G21C 3/40; nuclear power plants using thermionic converters G21D 7/04; structural combination of a radioactive source with a thermionic converter, e.g. radioisotope batteries G21H 1/10; generators in which thermal or kinetic energy is converted into electrical energy by ionisation of a fluid and removal of the charge therefrom H02N 3/00)}

Definition statement

This place covers:

Electric discharge tubes where a heat source thermionically emits electrons, producing an electric power output

References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Description</th>
<th>CPC Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermo-electric devices with a junction of dissimilar materials (Seebeck or Peltier effect)</td>
<td>H01L 35/00</td>
</tr>
<tr>
<td>Thermo-electric devices without a junction of dissimilar materials (Nernst-Ettinghausen effect)</td>
<td>H01L 37/00</td>
</tr>
<tr>
<td>Generators in which thermal or kinetic energy is converted into electrical energy by ionisation of a fluid and removal of the charge therefrom</td>
<td>H02N 3/00</td>
</tr>
</tbody>
</table>

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

<table>
<thead>
<tr>
<th>Description</th>
<th>CPC Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural combination of nuclear reactor fuel element with thermionic device</td>
<td>G21C 3/40</td>
</tr>
<tr>
<td>Nuclear power plants using thermionic converters</td>
<td>G21D 7/04</td>
</tr>
<tr>
<td>Structural combination of a radioactive source with a thermionic converter (radioisotope batteries)</td>
<td>G21H 1/10</td>
</tr>
</tbody>
</table>

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Description</th>
<th>CPC Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigeration machines, plant, or systems, using electric or magnetic effects</td>
<td>F25B 21/00</td>
</tr>
</tbody>
</table>
Synonyms and Keywords

In patent documents, the following abbreviations are often used:

| TIC | Thermionic Converter |

H01J 47/00

Tubes for determining the presence, intensity, density or energy of radiation or particles {(discharge tubes using igniting by associated radioactive materials or fillings, e.g. current stabilising tubes H01J 17/32; photoelectric discharge tubes not involving the ionisation of a gas H01J 40/00; discharge tubes for measuring the pressure, partial pressure of introduced gas or for detecting presence of gas H01J 41/02; ionisation chambers using a solid dielectric G01T 3/008)}

Definition statement

This place covers:

Electric discharge tubes used for detecting high energy radiation or particles by ionisation of the gas in the tube

References

Limiting references

This place does not cover:

| Discharge tubes using igniting by associated radioactive materials or fillings, e.g. current stabilising tubes | H01J 17/32 |
| Photoelectric discharge tubes not involving the ionisation of a gas | H01J 40/00 |
| Discharge tubes for measuring the pressure, partial pressure of introduced gas or for detecting presence of gas | H01J 41/02 |
| Measuring radiation intensity | G01T 1/16 |
| Measuring neutron radiation using an ionisation chamber filled with a gas, liquid or solid, e.g. frozen liquid, dielectric | G01T 3/008 |

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Radiation therapy | A61N 5/00 |
| Fire alarms using an ionisation chamber for detecting smoke or gas | G08B 17/11 |

H01J 49/00

Particle spectrometers or separator tubes

Definition statement

This place covers:

• Instruments arranged to generate a spectrum of charged particles according to their mass-to-charge ratio (mass spectrometers) or according to their energy (energy spectrometers);
• Details common to different types of spectrometers
References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Classification Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical spectrometry</td>
<td>G01J 3/00</td>
</tr>
<tr>
<td>Measuring spectral distribution of X-rays or of nuclear radiation</td>
<td>G01T 1/36</td>
</tr>
</tbody>
</table>

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Classification Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isotope separation by mass spectrography</td>
<td>B01D 59/44</td>
</tr>
<tr>
<td>Leak detectors using mass spectrometer detection systems</td>
<td>G01M 3/202</td>
</tr>
<tr>
<td>Analyzing materials by investigating the ionization of gases; by investigating electric discharges, e.g. emission of cathode</td>
<td>G01N 27/62</td>
</tr>
<tr>
<td>Mass spectrometers specially adapted for column chromatography</td>
<td>G01N 30/72</td>
</tr>
<tr>
<td>Methods of protein analysis involving mass spectrometry</td>
<td>G01N 33/6848</td>
</tr>
</tbody>
</table>

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Classification Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Containers for laboratory use, for the purpose of retaining a material to be analysed</td>
<td>B01L 3/50</td>
</tr>
<tr>
<td>Electrostatic spraying apparatus</td>
<td>B05B 5/00</td>
</tr>
<tr>
<td>General methods for the preparation of peptides</td>
<td>C07K 1/00</td>
</tr>
<tr>
<td>Methods for sequencing involving nucleic acids</td>
<td>C12Q 1/6869</td>
</tr>
<tr>
<td>Sampling; Preparing specimens for investigation</td>
<td>G01N 1/00</td>
</tr>
<tr>
<td>Investigating or analysing materials by the use of optical means (infrared, visible, ultraviolet radiation)</td>
<td>G01N 21/00</td>
</tr>
<tr>
<td>Investigating materials by measuring secondary emission</td>
<td>G01N 23/22</td>
</tr>
<tr>
<td>Automatic analysis devices for supplying samples to flow-through analysers</td>
<td>G01N 35/1095</td>
</tr>
<tr>
<td>Recognising patterns in signals and combinations thereof</td>
<td>G06K 9/00496</td>
</tr>
</tbody>
</table>

Special rules of classification

In classifying particle separators, no distinction is made between spectrometry and spectrography, the difference being only in the manner of detection which in the first case is electrical and in the second case is by means of a photographic film.

Classification codes "invention information" should be allocated only to features or aspects peculiar to the invention. Further elements described as conventional should not be classified.

Example: a particular combination of an electrospray ion source with a quadrupole ion guide should be classified in both G01J 49/165 and G01J 49/063. However, a particular electrospray ion source followed by either an ion guide, a capillary or a skimmer should be classified only in G01J 49/165.

Classification codes "additional information" should be allocated for the documents where the use of a particle spectrometer is an essential feature of an invention, but where a conventional instrument
is used. In this case allocation of a further code "invention information" (including circulation to other technical fields) is compulsory.

Example: if a method of protein analysis, classified in G01N 33/6848, includes an essential step of analysis by a standard time-of-flight mass spectrometer, H01J 49/40 should be allocated as additional information.

Synonyms and Keywords

<table>
<thead>
<tr>
<th>Synonym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CID</td>
<td>collision induced dissociation</td>
</tr>
<tr>
<td>ESI</td>
<td>electrospray ionisation</td>
</tr>
<tr>
<td>FT</td>
<td>fourier transform</td>
</tr>
<tr>
<td>ICR</td>
<td>ion cyclotron resonance</td>
</tr>
<tr>
<td>IMS</td>
<td>ion mobility spectrometry</td>
</tr>
<tr>
<td>MALDI</td>
<td>matrix-assisted laser/desorption ionisation</td>
</tr>
<tr>
<td>MS</td>
<td>mass spectrometry</td>
</tr>
<tr>
<td>Q or q</td>
<td>quadrupole employed in a combination, Q=with mass filtering, q=collision cell, e.g. Qq-TOF</td>
</tr>
<tr>
<td>QIT</td>
<td>quadrupole ion trap</td>
</tr>
<tr>
<td>TOF</td>
<td>time-of-flight</td>
</tr>
</tbody>
</table>

H01J 49/0004

{Imaging particle spectrometry}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Topic</th>
<th>CPC Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ion or electron microscope</td>
<td>H01J 37/26</td>
</tr>
<tr>
<td>Emission microscopes</td>
<td>H01J 37/285</td>
</tr>
<tr>
<td>Measuring secondary emission</td>
<td>G01N 23/22</td>
</tr>
<tr>
<td>Scanning probes</td>
<td>G01Q</td>
</tr>
<tr>
<td>Image processing</td>
<td>G06T</td>
</tr>
</tbody>
</table>

H01J 49/0018

{Microminiaturised spectrometers, e.g. chip-integrated devices, MicroElectro-Mechanical Systems [MEMS]}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Topic</th>
<th>CPC Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microstructural systems per se</td>
<td>B81B 7/00</td>
</tr>
</tbody>
</table>
H01J 49/0404
{Capillaries used for transferring samples or ions (electrospray nozzles H01J 49/167)}

Definition statement
This place covers:
e.g. EP1225616

FIG. - 1

FIG. - 2
H01J 49/0418
{for laser desorption, e.g. matrix-assisted laser desorption/ionisation [MALDI], surface enhanced laser desorption/ionisation [SELDI] plates}

Definition statement
This place covers:
e.g. WO200706164

H01J 49/061
{Ion deflecting means, e.g. ion gates}

Definition statement
This place covers:
e.g. US5696375
H01J 49/063

{Multipole ion guides, e.g. quadrupoles, hexapoles}

**Definition statement**

*This place covers:*

e.g. WO9938193

![Figure 2](image-url)
H01J 49/065

{having stacked electrodes, e.g. ring stack, plate stack}

Definition statement

This place covers:

e.g. EP1220291
H01J 49/066
{Ion funnels}

Definition statement

This place covers:
e.g. US6107628

Fig. 3
**H01J 49/067**

{Ion lenses, apertures, skimmers}

**Definition statement**

This place covers:

e.g. US6703610

*FIG. 3A*
**H01J 49/142**

(using a solid target which is not previously vapourised)

**Definition statement**

*This place covers:*

e.g. GB2143673

---

**FIG. 3**
H01J 49/147
{with electrons, e.g. electron impact ionisation, electron attachment
(H01J 49/145 takes precedence)}

Definition statement
This place covers:
e.g. US6452167

H01J 49/162
{Direct photo-ionisation, e.g. single photon or multi-photon ionisation}

Definition statement
This place covers:
e.g. US5763875
H01J 49/164

{Laser desorption/ionisation, e.g. matrix-assisted laser desorption/ionisation [MALDI] (sample holders H01J 49/0418)}

**Definition statement**

*This place covers:*
e.g. WO9963576

---

**FIG. 5**
**H01J 49/165**

{Electrospray ionisation}

**Definition statement**

*This place covers:*

e.g. EP0123552

---

**H01J 49/167**

{Capillaries and nozzles specially adapted therefor; (electrostatic spraying per se B05B 5/00)}

**Definition statement**

*This place covers:*

e.g. EP0566022
**H01J 49/288**

(using crossed electric and magnetic fields perpendicular to the beam, e.g. Wien filter)

**Definition statement**

*This place covers:*

e.g. US4019989

---

**H01J 49/322**

{with a magnetic sector of 90 degrees, e.g. Mattauch-Herzog type}

**Definition statement**

*This place covers:*

e.g. US3622781
H01J 49/328
{with a cycloidal trajectory by using crossed electric and magnetic fields, e.g. trochoidal type}

Definition statement
This place covers:
e.g. US5304799

H01J 49/36
Radio frequency spectrometers, e.g. Bennett-type spectrometers, Redhead-type spectrometers

Definition statement
This place covers:
e.g. US2955204
H01J 49/38
Omegatrons {Using ion cyclotron resonance}

Definition statement

This place covers:
e.g. WO03069651

FIG. 1
H01J 49/401

{characterised by orthogonal acceleration, e.g. focusing or selecting the ions, pusher electrode}

Definition statement

This place covers:

* e.g. US5763878

**Figure 1**
H01J 49/405
{characterised by the reflectron, e.g. curved field, electrode shapes}

Definition statement

This place covers:

e.g. GB2402545

FIG. 2
**H01J 49/406**
{with multiple reflections (electrostatic traps H01J 49/4245)}

**Definition statement**

*This place covers:*
e.g. WO2007044696
H01J 49/408

{with multiple changes of direction, e.g. by using electric or magnetic sectors, closed-loop time-of-flight}

Definition statement

This place covers:

e.g. US7227131

H01J 49/4215

{Quadrupole mass filters (H01J 49/4225 takes precedence)}

Definition statement

This place covers:

e.g. EP2299471
H01J 49/4225
{Multipole linear ion traps, e.g. quadrupoles, hexapoles}

Definition statement
This place covers:
e.g. WO9707530

H01J 49/423
{with radial ejection}

Definition statement
This place covers:
e.g. EP0684628
H01J 49/4235

{Stacked rings or stacked plates}

Definition statement

This place covers:

e.g. WO9214259

FIG. 1
H01J 49/424
{Three-dimensional ion traps, i.e. comprising end-cap and ring electrodes}

Definition statement

This place covers:
e.g. US5654542
H01J 49/4245

{Electrostatic ion traps (H01J 49/422 takes precedence; multi-reflection time of flight spectrometers H01J 49/406)}

Definition statement

This place covers:

e.g. US6888130

FIG. 2

---

Fourier transformation

\[ T = \sqrt{m} \]

preamp

---

21

20

30

11

5

11

0

x-axis
H01J 49/425
{with a logarithmic radial electric potential, e.g. orbitraps}

Definition statement
This place covers:

- e.g. EP1371081

FIG. 3

H01J 61/00
Gas- or vapour-discharge lamps (use for sterilising milk products A23C; use for medical purposes A61N 5/00; use for disinfecting water C02F; use for lighting F21; {use for advertising G09F} ; circuits therefor H05B; arc lamps with consumable electrodes H05B; electroluminescent lamps H05B)

Definition statement
This place covers:
Gas- or vapour-discharge lamps with main electrodes inside the vessel, and details thereof. In these lamps, the electrodes are not insulated from the discharge, e.g. by dielectric layers.

Examples of the discharge lamps covered here are:
• Low pressure discharge lamps, e.g. fluorescent lamps; compact fluorescent lamps;
• High pressure discharge lamps, e.g. high pressure mercury, sodium, xenon, or metal halide lamps;
• Gas filled flash lamps.

Relationships with other classification places
Lamps may further have one (or more) outer envelopes (e.g. a reflector lamp comprising an integral assembly of lamp and reflector; a discharge lamp for a vehicle headlight with an outer envelope); these are classified in H01J 61/00 as long as the lamp and outer envelope are integrally formed or
connected with each other and form one single item which can be connected to the power supply
connector. The combination of a reflector comprising a lamp socket and a corresponding (replaceable)
lamp is considered as a lighting system and is classified in the appropriate classes in F21V or F21S.

References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Reference</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC plasma displays</td>
<td>H01J 17/00</td>
</tr>
<tr>
<td>Cathode-ray or electron-stream lamps, a phosphor or a gas is brought to</td>
<td>H01J 63/00</td>
</tr>
<tr>
<td>luminescence by an electron beam</td>
<td></td>
</tr>
<tr>
<td>Lamps without any electrode inside the vessel; Lamps with at least one</td>
<td>H01J 65/00</td>
</tr>
<tr>
<td>main electrode outside the vessel, electrodeless lamps</td>
<td></td>
</tr>
<tr>
<td>Electric arc lamps with consumable electrodes</td>
<td>H05B 31/00</td>
</tr>
<tr>
<td>Electroluminescent light sources</td>
<td>H05B 33/00</td>
</tr>
<tr>
<td>Electric light sources using a combination of different types of light</td>
<td>H05B 35/00</td>
</tr>
<tr>
<td>generation</td>
<td></td>
</tr>
<tr>
<td>Circuit arrangements or apparatus for igniting or operating discharge</td>
<td>H05B 41/00</td>
</tr>
<tr>
<td>lamps</td>
<td></td>
</tr>
<tr>
<td>Plasma discharge EUV light sources, in which a gas is locally</td>
<td>H05G</td>
</tr>
<tr>
<td>compressed to create a discharge space and then allowed to expand into</td>
<td></td>
</tr>
<tr>
<td>a vacuum</td>
<td></td>
</tr>
<tr>
<td>X-ray radiation generated from plasma, e. g. EUV light sources</td>
<td>H05G 2/001</td>
</tr>
</tbody>
</table>

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for
a particular purpose, or incorporated in a larger system:

<table>
<thead>
<tr>
<th>Reference</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of discharge lamps for sterilising milk products</td>
<td>A23C 3/076</td>
</tr>
<tr>
<td>Use of discharge lamps for medical purposes, medical equipment using</td>
<td>A61N 5/06</td>
</tr>
<tr>
<td>discharge lamps, tanning devices</td>
<td></td>
</tr>
<tr>
<td>Non-portable lighting devices or systems thereof</td>
<td>F21S</td>
</tr>
<tr>
<td>Details of lighting devices, of general application</td>
<td>F21V</td>
</tr>
</tbody>
</table>

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Reference</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical, physical, or physico-chemical processes employing the direct</td>
<td>B01J 19/122</td>
</tr>
<tr>
<td>application of incoherent waves, e. g. ultraviolet light</td>
<td></td>
</tr>
<tr>
<td>Use of discharge lamps for disinfecting water, disinfecting apparatus</td>
<td>C02F 1/32</td>
</tr>
<tr>
<td>Luminaires or lighting devices containing a lamp</td>
<td>F21V, F21S</td>
</tr>
<tr>
<td>Use of discharge lamps for advertising, displays using discharge lamps</td>
<td>G09F 9/313</td>
</tr>
<tr>
<td>Adapters and connectors</td>
<td>H01R 33/00</td>
</tr>
</tbody>
</table>

Special rules of classification

Documents should be classified in all appropriate classes, i. e. multi-aspect classification is used.
If a document concerns embodiments or elements in detail which are covered by several subgroups dependent on a higher hierarchy group, the relevant information is classified in all the respective subgroups.

The higher hierarchy group is to be used:
• if no respective subgroup exists.
• if the general idea is relevant for the higher hierarchy as well as all the respective subgroups.

Lamp details are classified in group H01J 61/02 and subgroups thereof, if the details are integral with the lamp or directly attached or applied to the lamp, so that these go with the lamp when the lamp is removed from the power supply connector.

**Glossary of terms**

*In this place, the following terms or expressions are used with the meaning indicated:*

<table>
<thead>
<tr>
<th>Term</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>HID lamp</td>
<td>High intensity discharge lamp</td>
</tr>
<tr>
<td>HPS lamp</td>
<td>High pressure sodium lamp</td>
</tr>
<tr>
<td>MH lamp</td>
<td>High pressure metal halide lamp</td>
</tr>
<tr>
<td>CFL</td>
<td>Compact fluorescent lamp</td>
</tr>
<tr>
<td>CCFL</td>
<td>Cold cathode fluorescent lamp</td>
</tr>
<tr>
<td>CRI</td>
<td>Colour rendering index</td>
</tr>
<tr>
<td>Lamp</td>
<td>a lamp comprises the discharge vessel and all peripheral accessories which makes the lamp ready for being plugged in the appropriate power supply connector, i.e. the lamp &quot;ends&quot; with the first suitable connector which can be connected to a standardized or another suitable power supply connector.</td>
</tr>
</tbody>
</table>

**H01J 61/02**

**Details**

**Definition statement**

*This place covers:*

Details of gas or vapour discharge lamps covered by H01J 61/68 - H01J 61/98 and H01J 65/00.

Optical elements have an influence on the light distribution, e.g. focusing or changing the light emission characteristic

Further information:

Details within this group particularly suited for one or more specific lamp types are additionally covered by the appropriate subgroups for the relevant lamp type(s) in H01J 61/58 - H01J 61/98 and H01J 65/00.

**References**

**Limiting references**

*This place does not cover:*

<table>
<thead>
<tr>
<th>Type of detail</th>
<th>Subgroup(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamp bases or sockets integral with the discharge lamps</td>
<td>H01J 5/48, H01J 5/50</td>
</tr>
<tr>
<td>Methods of manufacturing discharge lamps or discharge lamp details</td>
<td>H01J 9/00</td>
</tr>
</tbody>
</table>
Informative references

Attention is drawn to the following places, which may be of interest for search:

| Details of electrodes, of magnetic control means, of screens, or of the mounting or spacing thereof, common to two or more basic types of discharge tubes or lamps | H01J 1/00 |
| Details relating to vessels or to leading-in conductors common to two or more basic types of discharge tubes or lamps | H01J 5/00 |
| Details of incandescent lamps | H01K 1/00 |

Special rules of classification

A subgroup for lamp sockets or bases is missing in H01J 61/00. These are classified in H01J 5/48 - H01J 61/62.

H01J 61/025

{Associated optical elements}

Definition statement

This place covers:
Optical elements integrally associated with the discharge lamp for influencing the spatial distribution of the emitted light:
• Refractive or reflective elements.
• Shields for production of specific dark/bright patterns.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Optical elements, systems or apparatus | G02B |
| Envelopes, vessels for incandescent lamps incorporating lenses | H01K 1/30 |

H01J 61/04

Electrodes (for igniting H01J 61/54); Screens; Shields

References

Limiting references

This place does not cover:

| Electrodes for igniting the lamp or used as starting aids | H01J 61/54 |
H01J 61/045

{Thermic screens or reflectors (heat-reflecting coatings on the wall of the vessel H01J 61/35)}

References

Limiting references

This place does not cover:

| Heat-reflecting coatings on the wall of the vessel | H01J 61/35 |

H01J 61/06

Main electrodes

Definition statement

This place covers:

Main electrodes for discharge lamps of the types covered by H01J 61/58 - H01J 61/98 and in H01J 65/00.

H01J 61/073

for high-pressure discharge lamps

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Alloys based on tungsten or molybdenum | C22C 27/04 |

H01J 61/103

{Shields, screens or guides arranged to extend the discharge path (H01J 61/106 takes precedence)}

References

Limiting references

This place does not cover:

| Means for influencing the discharge using magnetic means | H01J 61/106 |

H01J 61/12

Selection of substances for gas fillings; Specified operating pressure or temperature

Definition statement

This place covers:

Substances for gas fillings necessary for the operation of the discharge lamp, i. e. for
• the generation of the initial discharge,
• generating the voltage gradient,
• light emission,
• for establishing the desired spectral characteristics of the emitted light.

Gases added in small amounts, and which are not necessarily required for the operation of the lamp, are covered by the group reflecting the purpose of the gas filling, if available, otherwise in H01J 61/12.

Examples:
• Gases inside the discharge tube used for gettering or for avoiding blackening of the envelope H01J 61/26.
• Gas filled in the gap between outer envelope and discharge tube in a double-walled lamp H01J 61/34.
• Gas filled in cavities which serve as starting aid H01J 61/54.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

| Main constituent or principal constituent | should be construed as that filling component which is mainly responsive for the light emission. In many cases, the lamp contains a buffer gas, e.g. argon or xenon, which is necessary for initiating the discharge, but the main part of the light emission is provided for example by mercury or sodium vapour, a metal halide or other chemical substances which emits light in the conditions prevailing in the buffer gas discharge. |

H01J 61/16

having helium, argon, neon, krypton, or xenon as the principle constituent

Definition statement

This place covers:
Lamps which exclusively are filled with rare gases

References

Limiting references

This place does not cover:

Low pressure mercury vapour discharge lamp H01J 61/20

H01J 61/20

mercury vapour

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Composition of metal halide filling of metal halide lamps H01J 61/125
**H01J 61/24**

Means for obtaining or maintaining the desired pressure within the vessel

**References**

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

| Means for maintaining the desired pressure within the vessels of two or more basic types of discharge tubes | H01J 7/14 |

**H01J 61/26**

Means for absorbing or adsorbing gas, e.g. by gettering; Means for preventing blackening of the envelope

**References**

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

| Means for absorbing or adsorbing gas, e.g. by gettering, common to two or more basic types of discharge tubes | H01J 7/18 |

**H01J 61/28**

Means for producing, introducing, or replenishing gas or vapour during operation of the lamp

**References**

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

| Means for producing, introducing, or replenishing gas or vapour during operation of two or more the lamp | H01J 7/20 |

**H01J 61/30**

Vessels; Containers

**References**

*Informative references*

Attention is drawn to the following places, which may be of interest for search:

| Glass compositions | C03C |
| Compositions for glass with special properties | C03C 4/00 |
| Shaped ceramic products characterised by their composition | C04B 35/00 |
| Coatings produced by application to, or surface treatment of, optical elements, e.g. anti-reflection coatings | G02B 1/10 |
Details of incandescent lamps

H01J 61/30

CPC - H01J - 2019.01

H01J 61/32

Special longitudinal shape, e.g. for advertising purposes {H01J 61/305 takes precedence}

References

Limiting references

This place does not cover:

Flat vessels or containers of gas discharge lamps

H01J 61/305

H01J 61/325

{U-shaped lamps}

References

Limiting references

This place does not cover:

Compact fluorescent lamps

H01J 61/327

H01J 61/327

{"Compact"-lamps, i.e. lamps having a folded discharge path}

Definition statement

This place covers:

Fluorescent lamps with folded discharge path and with integral driving circuit, e. g. within the lamp base or socket, such that the lamp can replace incandescent lamps in common lighting fixtures

H01J 61/34

Double-wall vessels or containers

Definition statement

This place covers:

Examples:

• Discharge tubes with two or more walls.
• Lamps with a discharge tube enclosed in an outer envelope, e. g. high or low pressure discharge lamps with outer envelope.
• Reflector lamps containing a discharge tube within a closed reflector.
• Compact fluorescent lamps with outer envelope.
• Shatterproof enclosures directly mounted on the lamp, e. g. fluorescent lamps with a solid sleeve having shatterproof properties.
References

Limiting references

This place does not cover:

| Lamps with open reflectors | H01J 61/045 |

H01J 61/35

provided with coatings on the walls thereof; Selection of materials for the coatings (using coloured coatings H01J 61/40; using luminescent coatings H01J 61/42)

Definition statement

This place covers:

Coatings on the walls of discharge lamps.

Examples:

- Coatings on the walls of discharge tubes or of the outer envelope of double-walled lamps covered by H01J 61/34.
- Heat or UV-reflective coatings.
- Protective coatings.
- Shatterproof coatings applied to the external surface of the discharge lamp, e.g. by extrusion so as to directly adhere to the discharge tube.

References

Limiting references

This place does not cover:

| Coloured coatings in or on the envelope | H01J 61/40 |
| Devices for influencing the colour or wavelength of the light by transforming the wavelength of the light by luminescence | H01J 61/42 |

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Envelopes, vessels of incandescent lamps provided with coatings on the walls | H01K 1/32 |

H01J 61/38

Devices for influencing the colour or wavelength of the light

Definition statement

This place covers:

Light filters, coatings for influencing the wavelength or the colour of the emitted light, reflective or light diffusing coatings
References

Limiting references

This place does not cover:

| Devices for influencing the colour or wavelength of the light may be applied on the surface or the discharge tube or on the surfaces of outer envelopes of the lamps | H01J 61/34 |

Special rules of classification

Non-chemical aspects of luminescent materials are covered by H01J 2261/385, Examples:

Variable thickness profile of layers of luminescent material.

Spatial distribution of luminescent material on lamp surfaces.

**H01J 61/42**

by transforming the wavelength of the light by luminescence

Definition statement

This place covers:

Devices for transforming the wavelength of the light by luminescence:

Phosphor coatings characterized by non-chemical parameters, e.g. thickness profile, geometrical characteristics of the phosphor distribution on the vessel surface

**H01J 61/52**

Cooling arrangements; Heating arrangements; Means for circulating gas or vapour within the discharge space (heating or cooling arrangements to promote ionisation for starting H01J 61/54)

Definition statement

This place covers:

Means for cooling specific parts of discharge tube in the form of ribs or other structures integrally formed on or directly attached to the vessel in order to increase the surface of the vessel

References

Limiting references

This place does not cover:

| Heating or cooling arrangements to promote ionisation for starting | H01J 61/54 |

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Arrangement of a lamp and an external cooling fan | F21V 29/00 |
**H01J 61/56**

One or more circuit elements structurally associated with the lamp

**Definition statement**

*This place covers:*
- One or more circuit elements structurally associated with the lamp, the circuit elements must be structurally associated with the lamp. Many compact fluorescent lamps are characterized by an electronic ballast contained in the lamp base.
- Specific arrangements of the components in the lamp base

**References**

**Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

| Electronic ballasts or driving circuits per se | H05B 41/00 |

**H01J 61/64**

Cathode glow lamps (designed as tuning or voltage indicators **H01J 17/40**)

**References**

**Limiting references**

*This place does not cover:*

| Cathode glow lamps designed as tuning or voltage indicators | H01J 17/40 |

**H01J 61/66**

having one or more specially shaped cathodes, e.g. for advertising purposes {alphanumeric}

**Definition statement**

*This place covers:*
Discharge lamps having one or more specially shaped cathodes

Examples:
- for advertising purposes,
- for displaying alphanumeric characters.

**H01J 61/72**

having a main light-emitting filling of easily vaporisable metal vapour, e.g. mercury

**Definition statement**

*This place covers:*
Lamps with low-pressure unconstricted discharge.
Special rules of classification

The cold pressure limit <400 Torr is disregarded.

A fluorescent lamp containing a specific xenon-argon mix as buffer gas, mercury, and a specific phosphor mix with a specific mass density yields a power saving lamp with a higher lumen output per foot arc length should be classified in H01J 61/72. Nevertheless, the document should also be given the group symbols H01J 61/20 and H01J 61/44.

H01J 61/82

Lamps with high-pressure unconstricted discharge {having a cold pressure > 400 Torr}

Definition statement

This place covers:
Lamps with high-pressure unconstricted discharge.

Special rules of classification

The cold pressure limit >400 Torr is disregarded.

H01J 61/92

Lamps with more than one main discharge path

Definition statement

This place covers:
• Lamps with different discharge paths
• Lamps with one discharge vessel with a plurality of electrode pairs which form a plurality of discharge paths; these can be separated from each other by walls.
• Arrays of single path discharge lamps, if the array is contained in one common container which provides electrical connection to all single lamps. An example is an array of single fluorescent tubes in a parallel arrangement in a LCD backlight.

References

Limiting references

This place does not cover:

| Incandescent lamps with a filament heated only by non-luminous discharge | H01K 11/00 |

H01J 61/96

Lamps with light-emitting discharge path and separately-heated incandescent body within a common envelope, e.g. for simulating daylight

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Incandescent lamps with a filament heated only by non-luminous discharge | H01K 11/00 |
H01J 63/00
Cathode-ray or electron-stream lamps (flying-spot tubes H01J 31/10; magic-eye tuning indicators H01J 31/14; lamps with incandescent body heated by the ray or stream H01K (see also H01J 29/00))

Definition statement

This place covers:
Lamps and details of lamps in which an electron beam excites a luminescent material or a gas to emit light:
• Lamps in which an electron beam strikes a phosphor and excites the phosphor to luminescence
• Lamps in which an electron beam excites a gas to luminescence

Further information:
Details of cathode ray lamps which are also mentioned in a document to be suitable for a display tube are also covered by H01J 29/00 and H01J 31/00.

References

Limiting references

This place does not cover:

<table>
<thead>
<tr>
<th>Flying-spot tubes</th>
<th>H01J 31/10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magic-eye tuning indicators</td>
<td>H01J 31/14</td>
</tr>
<tr>
<td>Lamps with incandescent body heated by the ray or stream</td>
<td>H01K 11/00</td>
</tr>
</tbody>
</table>

Informative references

Attention is drawn to the following places, which may be of interest for search:

<table>
<thead>
<tr>
<th>Field emissive cathodes</th>
<th>H01J 1/304</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electron guns using field emission</td>
<td>H01J 3/021</td>
</tr>
<tr>
<td>Methods for manufacturing details of cathode ray or electron stream lamps</td>
<td>H01J 9/00</td>
</tr>
<tr>
<td>Details of display tubes</td>
<td>H01J 29/00</td>
</tr>
<tr>
<td>Display tubes</td>
<td>H01J 31/00</td>
</tr>
</tbody>
</table>

H01J 63/02
Details, e.g. electrode, gas filling, shape of vessel

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Field emission displays | H01J 31/123 |
H01J 63/06
Lamps with luminescent screen excited by the ray or stream

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

| Field emission displays | H01J 31/123 |

Special rules of classification

The more recent lamps which are classified in H01J 63/06 are structurally very similar or identical to field emission displays (H01J 31/123). In order to be classified in H01J 63/06, the document should state or strongly imply the use as a lamp, e.g. a backlight for an LCD display - it is not sufficient that the document refer to a "light emitting element" or use a similar term which also would be applicable to a single pixel or to a whole field emitter display (FED). If both uses (FED and lamp) are mentioned, the document is classified in both subclasses.

H01J 65/00
Lamps without any electrode inside the vessel; Lamps with at least one main electrode outside the vessel

Definition statement

This place covers:

Lamps without any electrode inside the vessel and electrodeless lamps, and details thereof:

- Microwave excited lamps in which the discharge tube is located in a microwave cavity
- Inductively coupled RF lamps in which the discharge tube is surrounded by an RF coil or antenna
- Lamps with external electrodes only
- Lamps with at least one main electrode outside the vessel
- Lamps in which the main electrodes are inside the vessel, but are separated from the discharge by a dielectric layer
- Lamps with a gas filling excited by internal or external corpuscular radiation

References

Limiting references

This place does not cover:

| Plasma displays | H01J 11/00 |
| Indicating arrangements for variable information in which the desired character or characters are formed by combining individual elements being gas discharge devices | G09F 9/313 |
| Circuit arrangements or apparatus for igniting or operating discharge lamps | H05B 41/00 |
**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Details of the lamps covered by H01J 65/00 are covered by the appropriate subgroup for lamp types in H01J 65/00 and, if available, also by the appropriate detail subgroups in H01J 61/00.

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>H01J 65/00</td>
<td>Lamps in which a screen or coating is excited to luminesce by radioactive material located inside the vessel.</td>
</tr>
<tr>
<td>H01J 61/06</td>
<td>Main electrodes</td>
</tr>
<tr>
<td>H01J 61/12</td>
<td>Substances for gas fillings</td>
</tr>
<tr>
<td>H01J 61/302</td>
<td>Material of the discharge tubes</td>
</tr>
<tr>
<td>H01J 61/54</td>
<td>Ignition aids</td>
</tr>
</tbody>
</table>

**Special rules of classification**

Means for coupling electromagnetic energy into the discharge tube are considered as a part of the lamp:

- Microwave or RF cavities, resonators, and waveguides in which the discharge tube is arranged
- RF coils or antennae surrounding or adjacent discharge tube

**H01J 65/08**

Lamps in which a screen or coating is excited to luminesce by radioactive material located inside the vessel (direct conversion of radiation energy from radioactive sources into light G21H 3/02)

**Definition statement**

This place covers:

Lamps in which a screen or coating is excited to luminesce by radioactive material located inside the vessel.

**References**

**Limiting references**

This place does not cover:

Direct conversion of radiation energy from radioactive sources into light G21H 3/02

**H01J 2235/082**

Fluids, e.g. liquids, gases

**Definition statement**

This place covers:

Targets which are in fluid state, including targets intended to melt during operation of the X-ray tube.

**H01J 2235/087**

Transmission type

**Definition statement**

This place covers:

Anodes producing X-rays of which the fraction passing through the anode is suitable to be used.
References

Limiting references

This place does not cover:

Anodes which serve as vacuum window or are integrally attached to the vacuum window

H01J 2235/088

Laminated targets, e.g. plurality of emitting layers of unique or differing materials

Definition statement

This place covers:

Targets made of more than one layer of material intended to emit X-rays.

References

Limiting references

This place does not cover:

Targets with layered structure including a single emissive layer, the other layers serving to improve the mechanical properties, the thermal properties.

H01J 2235/1266

flow being via moving conduit or shaft

Definition statement

This place covers:

Examples:

Rotating, hollow anodes cooled by water passed along the axis,

Cooling conduits that must be rotated during operation

H01J 2235/162

Rotation

Definition statement

This place covers:

Example:

Rotating the vessel for positioning purposes
References

Limiting references

This place does not cover:

Rotation of X-ray vessel where vessel is fixedly joint to anode in order to spread the heat e.g. Straton tube: H01J 35/305

H01J 2235/168

against charged particles

Definition statement

This place covers:

Shielding of X-ray vessels or other components of the tube e.g. against charged particles such as scattered or secondary electrons. Examples:

corona shields;
magnetic fields for shielding;
conductive layers

H01J 2235/18

Windows, e.g. for X-ray transmission

Definition statement

This place covers:

Structures transparent to x-rays but separating a space of certain properties e.g. ambient pressure from a space having different respective properties e.g. low pressure; including windows acting as target anodes.

H01J 2235/186

used as target or X-ray converter, e.g. transmission type

Definition statement

This place covers:

X-ray transparent windows used as target or targets integrally attached to a window and used in transmission mode

References

Limiting references

This place does not cover:

Transmission type target anodes not providing vacuum sealing H01J 2235/087
**H01J 2237/00**

Discharge tubes exposing object to beam, e.g. for analysis treatment, etching, imaging

**Definition statement**

This place covers:

Further information:

The codes in this main group are grouped according to the following principle:

details common to gas or plasma discharge of the above mentioned tubes:  
H01J 2237/00 - H01J 2237/2487

imaging

or analysing:  
H01J 2237/25 - H01J 2237/2857

particlebeam processing:  
H01J 2237/30 - H01J 2237/31747

plasma processing:  
H01J 2237/32 - H01J 2237/339

Codes in the scheme H01J 2237/00 and subgroups are usually marked with the month of their creation ([Nyymm] means "new in month mm of year yy") and are generally not reclassified. These codes are thus not complete, i.e. not all documents classified in subgroups of H01J 37/00, for which a respective code in subgroups of H01J 2237/00 would be adequate, have such a code.

**Special rules of classification**

All limiting references or precedence rules within H01J 2237/00 and subgroups thereof apply only within H01J 2237/00 (and subgroups thereof) and in particular not in view of groups the scheme H01J 37/00 and subgroups thereof, if not a group in H01J 37/00 or below is explicitly referred to.

General Reminder:

For features of general interest which may be found in other types of discharge tubes, an indexing-code corresponding to general schemes H01J 2201/00 - H01J 2207/00 is given, e.g. for cathodes, vessels, cooling means or the like.

Same rules apply for manufacturing procedures (H01J 2209/00), unless really specific to the tube concerned.

**H01J 2237/002**

Cooling arrangements (of objects being observed or treated H01J 2237/2001)

**References**

**Limiting references**

This place does not cover:

| Cooling arrangements of objects being observed or treated | H01J 2237/2001 |
H01J 2237/006
Details of gas supplies, e.g. in an ion source, to a beam line, to a specimen or to a workpiece, (H01J 37/3244 takes precedence; environmental cells for electron microscopes H01J 2237/2003; microscopes with environmental specimen chamber H01J 2237/2008)

References
Limiting references
This place does not cover:

| Gas supply means for processing objects by plasma generation | H01J 37/3244 |

Informative references
Attention is drawn to the following places, which may be of interest for search:

| Environmental cells for electron microscopes | H01J 2237/2003 |
| Microscopes with environmental specimen chamber | H01J 2237/2008 |

H01J 2237/024
Moving components not otherwise provided for (diaphragms H01J 2237/0458; objects H01J 2237/202)

References
Limiting references
This place does not cover:

| Moving components for diaphragms | H01J 2237/0458 |
| Moving components for objects | H01J 2237/202 |

H01J 2237/026
Shields

Definition statement
This place covers:
Shields - both shielding the beam from influence thereon and shielding the environment from influence due to the tube

H01J 2237/0492
Lens systems (individual lenses H01J 2237/10)

References
Limiting references
This place does not cover:

| Individual lenses | H01J 2237/10 |
H01J 2237/05
Arrangements for energy or mass analysis

Glossary of terms
In this place, the following terms or expressions are used with the meaning indicated:
analysis in H01J 2237/05 and subgroups relates to forming a spectrum; filtering relates to selecting
mass or energy of (one) particular value(s)

H01J 2237/065
Source emittance characteristics

References
Limiting references
This place does not cover:

| Beam diagnostics anywhere in beam | H01J 2237/24514 |

Further information:
Diagnostics only for the source

H01J 2237/08
Ion sources

References
Limiting references
This place does not cover:

| Ion sources for mass spectrometers | H01J 49/10 |

H01J 2237/0805
Liquid metal sources

Synonyms and Keywords
common acronym: LMIS

H01J 2237/0807
Gas field ion sources [GFIS]

Synonyms and Keywords
common acronym: GFIS
**H01J 2237/0812**
Ionized cluster beam [ICB] sources

**Definition statement**
*This place covers:*
gas cluster ion beam sources and other cluster beam ion sources (cluster in this respect means a group of similar atoms or molecules)

**Synonyms and Keywords**
acronym for gas cluster ion beam : GCIB

**H01J 2237/141**
Coils (superconducting H01J 2237/142)

**References**

*Limiting references*
*This place does not cover:*

| Superconducting coils | H01J 2237/142 |

**H01J 2237/1505**
Rotating beam around optical axis

**Definition statement**
*This place covers:*
Example:
What is called "scan rotation" in SEMs

**H01J 2237/16**
Vessels (liner tubes H01J 2237/0268)

**References**

*Limiting references*
*This place does not cover:*

| Liner tubes | H01J 2237/0268 |

**H01J 2237/182**
Obtaining or maintaining desired pressure

**Definition statement**
*This place covers:*
Both means and methods
**H01J 2237/188**

**Differential pressure**

**Definition statement**

*This place covers:*

Example:

Also specific arrangements for differential pressure of field emission guns

**H01J 2237/2001**

**Maintaining constant desired temperature**

**Definition statement**

*This place covers:*

Both heating and/or cooling

**H01J 2237/2002**

**Controlling environment of sample**

**Definition statement**

*This place covers:*

Controlling the environment of the sample in view of e.g. gas pressure, specific types of gases or gas composition, etc.

**References**

**Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

<table>
<thead>
<tr>
<th>Elevated pressure</th>
<th>H01J 2237/2605</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental microscopes</td>
<td>H01J 2237/2608</td>
</tr>
</tbody>
</table>

**H01J 2237/2006**

**Vacuum seals**

**Definition statement**

*This place covers:*

Vacuum seals associated with the stage, e.g. seals for adjustment screws of the sample stage

**H01J 2237/20242**

**Eucentric movement**

**Definition statement**

*This place covers:*

Moving the sample such that it stays in focus
H01J 2237/20271
Temperature responsive devices

Definition statement
This place covers:
Example:
Temperature dilation of positioning element used to move sample

H01J 2237/204
Means for introducing and/or outputting objects (locks H01J 2237/184)

References
Limiting references
This place does not cover:

 Vacuum locks  H01J 2237/184

H01J 2237/2065
Temperature variations (maintaining constant desired temperature H01J 2237/2001)

References
Limiting references
This place does not cover:

 Maintaining constant desired temperature  H01J 2237/2001

H01J 2237/2067
Surface alteration

Definition statement
This place covers:
Surface alteration of samples to be analysed or inspected, e.g. ion bombardment to modify sample surface in an SEM

References
Limiting references
This place does not cover:

 Processing of objects per se  H01J 2237/30
H01J 2237/21
Focus adjustment (lenses H01J 2237/10)

References
Limiting references
This place does not cover:

| Lenses                           | H01J 2237/10 |

H01J 2237/22
Treatment of data (mixing signals H01J 2237/24495)

References
Limiting references
This place does not cover:

| Mixing signals                  | H01J 2237/24495 |
| Image processing as such        | G06T           |

H01J 2237/228
Charged particle holography

References
Informative references
Attention is drawn to the following places, which may be of interest for search:

| Electron or ion microscopes for holography | H01J 2237/2614 |
| Holographic processes or apparatus using particles or using waves | G03H 5/00 |

H01J 2237/24507
Intensity, dose or other characteristics of particle beams or electromagnetic radiation

References
Limiting references
This place does not cover:

| Beam diagnostics including respective control | H01J 2237/24514 |
H01J 2237/24514

Beam diagnostics including control of the parameter or property diagnosed (H01J 2237/30472 takes precedence)

References

Limiting references
This place does not cover:

| Controlling the beam in electron or ion beam tubes for processing objects | H01J 2237/30472 |

H01J 2237/24528

Direction of beam or parts thereof in view of the optical axis, e.g. beam angle, angular distribution, beam divergence, beam convergence or beam landing angle on sample or workpiece (means for deflecting or directing discharge H01J 2237/15)

References

Informative references
Attention is drawn to the following places, which may be of interest for search:

| Means for deflecting or directing discharge | H01J 2237/15 |

H01J 2237/24564

Measurements of electric or magnetic variables, e.g. voltage, current, frequency

Definition statement

This place covers:
Example:
Voltage contrast, charging of sample, leakage current in sample to sample holder, magnetic imaging of sample

References

Informative references
Attention is drawn to the following places, which may be of interest for search:

| When related to the tube | H01J 2237/2594 |

H01J 2237/2482

Optical means

Definition statement

This place covers:
Example:
Focus control by additional light-optical microscopes

**H01J 2237/2583**

using tunnel effects, e.g. STM, AFM

**Definition statement**

*This place covers:*

Microprobes using tunnel effect only in combination with tubes of [H01J 37/00](#), e.g. LEED or RHEED in combination with STM

**References**

**Limiting references**

*This place does not cover:*

| STM, AFM, etc. per se | G01Q |

**H01J 2237/2608**

with environmental specimen chamber (environmental cells [H01J 2237/2003](#))

**References**

**Limiting references**

*This place does not cover:*

| Environmental cells | H01J 2237/2003 |

**H01J 2237/2614**

Holography or phase contrast, phase related imaging in general, e.g. phase plates

**References**

**Limiting references**

*This place does not cover:*

| Treatment of data | H01J 2237/228 |

**Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

| Holographic processes or apparatus using particles | G03H 5/00 |
### H01J 2237/2617
Comparison or superposition of transmission images; Moiré

**Definition statement**

*This place covers:*

Example:

Methods for image compare

### H01J 2237/2826
Calibration (for object processing apparatus H01J 2237/30433)

**References**

**Limiting references**

*This place does not cover:*

| Calibration for object processing apparatus | H01J 2237/30433 |

### H01J 2237/30433
System calibration (for microscopes H01J 2237/2826)

**References**

**Limiting references**

*This place does not cover:*

| System calibration for microscopes | H01J 2237/2826 |

### H01J 2237/3045
Deflection calibration (deflecting in general H01J 2237/15; specific to material treating H01J 2237/30483)

**References**

**Limiting references**

*This place does not cover:*

| Deflection calibration specific to material treating | H01J 2237/30483 |

**Informative references**

Attention is drawn to the following places, which may be of interest for search:

| Deflecting in general | H01J 2237/15 |
H01J 2237/30466
Detecting endpoint of process (for plasma apparatus H01J 37/32963, for sputtering apparatus H01J 37/3479)

References

Limiting references

This place does not cover:

| Detecting endpoint of process for plasma apparatus | H01J 37/32963 |
| Detecting endpoint of process for plasma apparatus, for sputtering apparatus | H01J 37/3479 |

H01J 2237/31705
Impurity or contaminant control

Definition statement

This place covers:
Control of contamination stemming from the ion source or beam line

H01J 2237/31732
Depositing thin layers on selected microareas (ion plating H01J 2237/3142)

References

Limiting references

This place does not cover:

| Ion plating | H01J 2237/3142 |