

CPC COOPERATIVE PATENT CLASSIFICATION

C CHEMISTRY; METALLURGY

(NOTES omitted)

CHEMISTRY

C10 PETROLEUM, GAS OR COKE INDUSTRIES; TECHNICAL GASES CONTAINING CARBON MONOXIDE; FUELS; LUBRICANTS; PEAT

C10G CRACKING HYDROCARBON OILS; PRODUCTION OF LIQUID HYDROCARBON MIXTURES, e.g. BY DESTRUCTIVE HYDROGENATION, OLIGOMERISATION, POLYMERISATION (cracking to hydrogen or synthesis gas [C01B](#); cracking or pyrolysis of hydrocarbon gases to individual hydrocarbons or mixtures thereof of definite or specified constitution [C07C](#); cracking to cokes [C10B](#)); RECOVERY OF HYDROCARBON OILS FROM OIL-SHALE, OIL-SAND, OR GASES; REFINING MIXTURES MAINLY CONSISTING OF HYDROCARBONS; REFORMING OF NAPHTHA; MINERAL WAXES

NOTES

- In this subclass,
 - groups [C10G 9/00](#) - [C10G 49/00](#) are limited to one-step processes;
 - combined or multi-step processes are covered by groups [C10G 51/00](#) - [C10G 69/00](#);
 - refining or recovery of mineral waxes is covered by group [C10G 73/00](#)
- In this subclass, the following terms or expressions are used with the meanings indicated:
 - "in the presence of hydrogen" or "in the absence of hydrogen" mean treatments in which hydrogen, in free form or as hydrogen generating compounds, is added, or not added, respectively;
 - "hydrotreatment" is used for conversion processes as defined in group [C10G 45/00](#) or group [C10G 47/00](#);
 - "hydrocarbon oils" covers mixtures of hydrocarbons such as tar oils or mineral oils.
- In this subclass, in the absence of an indication to the contrary, classification is made in the last appropriate place.

WARNINGS

- The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:

C10G 73/23	covered by	C10G 73/06
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- In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

1/00	Production of liquid hydrocarbon mixtures from oil-shale, oil-sand, or non-melting solid carbonaceous or similar materials, e.g. wood, coal (mechanical winning of oil from oil-shales, oil-sand, or the like B03B)	1/083 1/086 1/10	. . {in the presence of a solvent} . . {Characterised by the catalyst used} . from rubber or rubber waste
1/002	. {in combination with oil conversion- or refining processes}	2/00	Production of liquid hydrocarbon mixtures of undefined composition from oxides of carbon
1/004	. {Inhibiting of corrosion}	2/30	. {from carbon monoxide with hydrogen}
1/006	. {Combinations of processes provided in groups C10G 1/02 - C10G 1/08 }	2/31	. . {thermal, non catalytic conversion}
1/008	. {Controlling or regulating of liquefaction processes}	2/32	. . {with the use of catalysts}
1/02	. by distillation	2/33	. . . {characterised by the catalyst used}
1/04	. by extraction	2/331	. . . . {containing group VIII-metals}
1/042	. . {by the use of hydrogen-donor solvents}	2/332	. . . . . {of the iron-group}
1/045	. . {Separation of insoluble materials}	2/333	. . . . . {of the platinum-group}
1/047	. . {Hot water or cold water extraction processes}	2/334	. . . . . {containing molecular sieve catalysts}
1/06	. by destructive hydrogenation	2/34	. . . {Apparatus, reactors}
1/065	. . {in the presence of a solvent}	2/341	. . . . {with stationary catalyst bed}
1/08	. with moving catalysts	2/342	. . . . {with moving solid catalysts}
		2/343	. . . . . {according to the "moving-bed" method}
		2/344	. . . . . {according to the "fluidised-bed" technique}

- 2/35 . . {with the use of another activation, e.g. radiation, vibration, electrical or electromagnetic means}
- 2/40 . {from carbon monoxide with water vapor}
- 2/50 . {from carbon dioxide with hydrogen}

3/00 Production of liquid hydrocarbon mixtures from oxygen-containing organic materials, e.g. fatty oils, fatty acids (production from non-melting solid oxygen-containing carbonaceous materials C10G 1/00)

- 3/40 . {Thermal non-catalytic treatment}
- 3/42 . {Catalytic treatment}
- 3/44 . . {characterised by the catalyst used}
- 3/45 . . . {containing iron group metals or compounds thereof}
- 3/46 {in combination with chromium, molybdenum, tungsten metals or compounds thereof}
- 3/47 . . . {containing platinum group metals or compounds thereof}
- 3/48 . . . {further characterised by the catalyst support}
- 3/49 {containing crystalline aluminosilicates, e.g. molecular sieves}
- 3/50 . {in the presence of hydrogen, hydrogen donors or hydrogen generating compounds}
- 3/52 . . {Hydrogen in a special composition or from a special source}
- 3/54 . {characterised by the catalytic bed}
- 3/55 . . {with moving solid particles, e.g. moving beds}
- 3/56 . . . {suspended in the oil, e.g. slurries, ebullated beds}
- 3/57 {according to the fluidised bed technique}
- 3/60 . {Controlling or regulating the processes}
- 3/62 . {Catalyst regeneration}

5/00 Recovery of liquid hydrocarbon mixtures from gases, e.g. natural gas

- 5/02 . with solid adsorbents
- 5/04 . with liquid absorbents
- 5/06 . by cooling or compressing

7/00 Distillation of hydrocarbon oils

- 7/003 . {distillation of lubricating oils}
- 7/006 . {of waste oils other than lubricating oils, e.g. PCB's containing oils}
- 7/02 . Stabilising gasoline by removing gases by fractioning
- 7/04 . Dewatering
- 7/06 . Vacuum distillation
- 7/08 . Azeotropic or extractive distillation (refining of hydrocarbon oils, in the absence of hydrogen, by extraction with selective solvents C10G 21/00)
- 7/10 . Inhibiting corrosion during distillation
- 7/12 . Controlling or regulating

Cracking in the absence of hydrogen

9/00 Thermal non-catalytic cracking, in the absence of hydrogen, of hydrocarbon oils

- 9/002 . {Cooling of cracked gases}
- 9/005 . {Coking (in order to produce liquid products mainly)}
- 9/007 . {Visbreaking}
- 9/02 . in retorts
- 9/04 . . Retorts

- 9/06 . by pressure distillation
- 9/08 . . Apparatus therefor
- 9/12 . . . Removing incrustation
- 9/14 . in pipes or coils with or without auxiliary means, e.g. digesters, soaking drums, expansion means
- 9/16 . . Preventing or removing incrustation
- 9/18 . . Apparatus
- 9/20 . . . Tube furnaces
- 9/203 {chemical composition of the tubes}
- 9/206 {controlling or regulating the tube furnaces}
- 9/24 . by heating with electrical means
- 9/26 . with discontinuously preheated non-moving solid material, e.g. blast and run
- 9/28 . with preheated moving solid material
- 9/30 . . according to the "moving bed" method
- 9/32 . . according to the "fluidised-bed" technique
- 9/34 . by direct contact with inert preheated fluids, e.g. with molten metals or salts
- 9/36 . . with heated gases or vapours
- 9/38 . . . produced by partial combustion of the material to be cracked or by combustion of another hydrocarbon
- 9/40 . by indirect contact with preheated fluid other than hot combustion gases
- 9/42 . by passing the material to be cracked in thin streams or as spray on or near continuously heated surfaces

11/00 Catalytic cracking, in the absence of hydrogen, of hydrocarbon oils (cracking in direct contact with molten metals or salts C10G 9/34)

- 11/02 . characterised by the catalyst used
- 11/04 . . Oxides
- 11/05 . . . Crystalline alumino-silicates, e.g. molecular sieves
- 11/06 . . Sulfides
- 11/08 . . Halides
- 11/10 . with stationary catalyst bed
- 11/12 . with discontinuously preheated non-moving solid catalysts, e.g. blast and run
- 11/14 . with preheated moving solid catalysts
- 11/16 . . according to the "moving bed" method
- 11/18 . . according to the "fluidised-bed" technique
- 11/182 . . . {Regeneration}
- 11/185 {Energy recovery from regenerator effluent gases}
- 11/187 {Controlling or regulating}
- 11/20 . by direct contact with inert heated gases or vapours
- 11/22 . . produced by partial combustion of the material to be cracked

15/00 Cracking of hydrocarbon oils by electric means, electromagnetic or mechanical vibrations, by particle radiation or with gases superheated in electric arcs

- 15/08 . by electric means or by electromagnetic or mechanical vibrations
- 15/10 . by particle radiation
- 15/12 . with gases superheated in an electric arc, e.g. plasma

Refining in the absence of hydrogen

- 17/00 Refining of hydrocarbon oils in the absence of hydrogen, with acids, acid-forming compounds or acid-containing liquids, e.g. acid sludge**

- 17/02 . with acids or acid-containing liquids, e.g. acid sludge
- 17/04 . . Liquid-liquid treatment forming two immiscible phases
- 17/06 . . . using acids derived from sulfur or acid sludge thereof
- 17/07 . . . using halogen acids or oxyacids of halogen (acids generating halogen [C10G 27/02](#))
- 17/08 . with acid-forming oxides (refining with CO₂ or SO₂ as a selective solvent [C10G 21/06](#))
- 17/085 . . with oleum
- 17/09 . with acid salts
- 17/095 . with "solid acids", e.g. phosphoric acid deposited on a carrier
- 17/10 . Recovery of used refining agents
- 19/00 Refining hydrocarbon oils in the absence of hydrogen, by alkaline treatment**
- 19/02 . with aqueous alkaline solutions
- 19/04 . . containing solubilisers, e.g. solutisers
- 19/06 . . with plumbites or plumbates
- 19/067 . with molten alkaline material
- 19/073 . with solid alkaline material
- 19/08 . Recovery of used refining agents
- 21/00 Refining of hydrocarbon oils, in the absence of hydrogen, by extraction with selective solvents (C10G 17/00, C10G 19/00 take precedence)**
- 21/003 . {Solvent de-asphalting}
- 21/006 . {of waste oils, e.g. PCB's containing oils}
- 21/02 . with two or more solvents, which are introduced or withdrawn separately
- 21/04 . . by introducing simultaneously at least two immiscible solvents counter-current to each other
- 21/06 . characterised by the solvent used
- 21/08 . . Inorganic compounds only
- 21/10 . . . Sulfur dioxide
- 21/12 . . Organic compounds only
- 21/14 . . . Hydrocarbons
- 21/16 . . . Oxygen-containing compounds
- 21/18 . . . Halogen-containing compounds
- 21/20 . . . Nitrogen-containing compounds
- 21/22 . . . Compounds containing sulfur, selenium, or tellurium
- 21/24 . . . Phosphorus-containing compounds
- 21/26 . . . Silicon-containing compounds
- 21/27 . . . Organic compounds not provided for in a single one of groups [C10G 21/14](#) - [C10G 21/26](#)
- 21/28 . Recovery of used solvent
- 21/30 . Controlling or regulating
- 25/00 Refining of hydrocarbon oils in the absence of hydrogen, with solid sorbents**
- NOTE**
- When classifying in this group, classification is also made in group [B01D 15/08](#) insofar as subject matter of general interest relating to chromatography is concerned.
- 25/003 . {Specific sorbent material, not covered by [C10G 25/02](#) or [C10G 25/03](#)}
- 25/006 . {of waste oils, e.g. PCB's containing oils}
- 25/02 . with ion-exchange material
- 25/03 . . with crystalline alumino-silicates, e.g. molecular sieves
- 25/05 . . . Removal of non-hydrocarbon compounds, e.g. sulfur compounds
- 25/06 . with moving sorbents or sorbents dispersed in the oil
- 25/08 . . according to the "moving bed" method
- 25/09 . . according to the "fluidised bed" technique
- 25/11 . . Distillation in the presence of moving sorbents
- 25/12 . Recovery of used adsorbent
- 27/00 Refining of hydrocarbon oils in the absence of hydrogen, by oxidation**
- 27/02 . with halogen or compounds generating halogen; Hypochlorous acid or salts thereof
- 27/04 . with oxygen or compounds generating oxygen
- 27/06 . . in the presence of alkaline solutions
- 27/08 . . in the presence of copper chloride
- 27/10 . . in the presence of metal-containing organic complexes, e.g. chelates, or cationic ion-exchange resins
- 27/12 . . with oxygen-generating compounds, e.g. per-compounds, chromic acid, chromates (plumbites or plumbates [C10G 19/06](#))
- 27/14 . . with ozone-containing gases
- 29/00 Refining of hydrocarbon oils, in the absence of hydrogen, with other chemicals**
- 29/02 . Non-metals
- 29/04 . Metals, or metals deposited on a carrier
- 29/06 . Metal salts, or metal salts deposited on a carrier
- 29/08 . . containing the metal in the lower valency
- 29/10 . . Sulfides
- 29/12 . . Halides
- 29/16 . Metal oxides
- 29/20 . Organic compounds not containing metal atoms
- 29/205 . {by reaction with hydrocarbons added to the hydrocarbon oil}
- 29/22 . . containing oxygen as the only hetero atom
- 29/24 . . . Aldehydes or ketones
- 29/26 . . Halogenated hydrocarbons
- 29/28 . . containing sulfur as the only hetero atom, e.g. mercaptans, or sulfur and oxygen as the only hetero atoms
- 31/00 Refining of hydrocarbon oils, in the absence of hydrogen, by methods not otherwise provided for (by distillation C10G 7/00)**
- 31/06 . by heating, cooling, or pressure treatment
- 31/08 . by treating with water
- 31/09 . by filtration
- 31/10 . with the aid of centrifugal force
- 31/11 . by dialysis
- 32/00 Refining of hydrocarbon oils by electric or magnetic means, by irradiation, or by using microorganisms**
- 32/02 . by electric or magnetic means
- 32/04 . by particle radiation
- 33/00 Dewatering or demulsification of hydrocarbon oils (by distillation C10G 7/04)**
- 33/02 . with electrical or magnetic means
- 33/04 . with chemical means
- 33/06 . with mechanical means, e.g. by filtration

- 33/08 . Controlling or regulating
- 35/00 Reforming naphtha**
- NOTE**
- By reforming is meant the treatment of naphtha, in order to improve the octane number or its aromatic content.
- 35/02 . Thermal reforming
- 35/04 . Catalytic reforming
- 35/06 . . characterised by the catalyst used
- 35/065 . . . {containing crystalline zeolitic molecular sieves, other than aluminosilicates}
- 35/085 . . . containing platinum group metals or compounds thereof
- 35/09 Bimetallic catalysts in which at least one of the metals is a platinum group metal
- 35/095 . . . containing crystalline alumino-silicates, e.g. molecular sieves {[C10G 35/065](#) takes precedence}
- 35/10 . . with moving catalysts
- 35/12 . . . according to the "moving-bed" method
- 35/14 . . . according to the "fluidised-bed" technique
- 35/16 . with electric, electromagnetic, or mechanical vibrations; by particle radiation
- 35/22 . Starting-up reforming operations
- 35/24 . Controlling or regulating of reforming operations
- 45/34 . . characterised by the catalyst used
- 45/36 . . . containing nickel or cobalt metal, or compounds thereof
- 45/38 in combination with chromium, molybdenum or tungsten metals, or compounds thereof
- 45/40 . . . containing platinum group metals or compounds thereof
- 45/42 . . with moving solid particles
- 45/44 . Hydrogenation of the aromatic hydrocarbons
- 45/46 . . characterised by the catalyst used
- 45/48 . . . containing nickel or cobalt metal, or compounds thereof
- 45/50 in combination with chromium, molybdenum or tungsten metal, or compounds thereof
- 45/52 . . . containing platinum group metals or compounds thereof
- 45/54 . . . containing crystalline alumino-silicates, e.g. molecular sieves
- 45/56 . . with moving solid particles
- 45/58 . to change the structural skeleton of some of the hydrocarbon content without cracking the other hydrocarbons present, e.g. lowering pour point; Selective hydrocracking of normal paraffins [\(C10G 32/00](#) takes precedence; improving or increasing the octane number or aromatic content of naphtha [C10G 35/00](#))
- 45/60 . . characterised by the catalyst used
- 45/62 . . . containing platinum group metals or compounds thereof
- 45/64 . . . containing crystalline alumino-silicates, e.g. molecular sieves
- 45/66 . . with moving solid particles
- 45/68 . . Aromatisation of hydrocarbon oil fractions
- 45/70 . . . with catalysts containing platinum group metals or compounds thereof
- 45/72 . Controlling or regulating

Hydrotreatment processes**45/00 Refining of hydrocarbon oils using hydrogen or hydrogen-generating compounds****NOTE**

Treatment of hydrocarbon oils in the presence of hydrogen-generating compounds not provided for in a single one of groups [C10G 45/02](#), [C10G 45/32](#), [C10G 45/44](#) or [C10G 45/58](#) is provided for in group [C10G 49/00](#).

- 45/02 . to eliminate hetero atoms without changing the skeleton of the hydrocarbon involved and without cracking into lower boiling hydrocarbons; Hydrofinishing
- 45/04 . . characterised by the catalyst used
- 45/06 . . . containing nickel or cobalt metal, or compounds thereof
- 45/08 in combination with chromium, molybdenum, or tungsten metals, or compounds thereof
- 45/10 . . . containing platinum group metals or compounds thereof
- 45/12 . . . containing crystalline alumino-silicates, e.g. molecular sieves
- 45/14 . . with moving solid particles
- 45/16 . . . suspended in the oil, e.g. slurries
- 45/18 . . . according to the "moving-bed" technique
- 45/20 . . . according to the "fluidised-bed" technique
- 45/22 . . with hydrogen dissolved or suspended in the oil
- 45/24 . . with hydrogen-generating compounds
- 45/26 . . . Steam or water
- 45/28 . . . Organic compounds; Autofining
- 45/30 characterised by the catalyst used
- 45/32 . Selective hydrogenation of the diolefin or acetylene compounds
- 47/00 Cracking of hydrocarbon oils, in the presence of hydrogen or hydrogen-generating compounds, to obtain lower boiling fractions** ([C10G 15/00](#) takes precedence; destructive hydrogenation of non-melting solid carbonaceous or similar materials [C10G 1/06](#))
- 47/02 . characterised by the catalyst used
- 47/04 . . Oxides
- 47/06 . . Sulfides
- 47/08 . . Halides
- 47/10 . . with catalysts deposited on a carrier
- 47/12 . . . Inorganic carriers
- 47/14 the catalyst containing platinum group metals or compounds thereof
- 47/16 Crystalline alumino-silicate carriers
- 47/18 the catalyst containing platinum group metals or compounds thereof
- 47/20 the catalyst containing other metals or compounds thereof
- 47/22 . Non-catalytic cracking in the presence of hydrogen
- 47/24 . with moving solid particles
- 47/26 . . suspended in the oil, e.g. slurries
- 47/28 . . according to the "moving-bed" technique
- 47/30 . . according to the "fluidised-bed" technique
- 47/32 . in the presence of hydrogen-generating compounds
- 47/34 . . Organic compounds, e.g. hydrogenated hydrocarbons

47/36	. Controlling or regulating	55/00	Treatment of hydrocarbon oils, in the absence of hydrogen, by at least one refining process and at least one cracking process
49/00	Treatment of hydrocarbon oils, in the presence of hydrogen or hydrogen-generating compounds, not provided for in a single one of groups C10G 45/02, C10G 45/32, C10G 45/44, C10G 45/58 or C10G 47/00	55/02	. plural serial stages only
49/002	. {Apparatus for fixed bed hydrotreatment processes}	55/04	. . including at least one thermal cracking step
49/005	. {Inhibiting corrosion in hydrotreatment processes}	55/06	. . including at least one catalytic cracking step
49/007	. {in the presence of hydrogen from a special source or of a special composition or having been purified by a special treatment}	55/08	. plural parallel stages only
49/02	. characterised by the catalyst used	57/00	Treatment of hydrocarbon oils, in the absence of hydrogen, by at least one cracking process or refining process and at least one other conversion process
49/04	. . containing nickel, cobalt, chromium, molybdenum, or tungsten metals, or compounds thereof	57/005	. {with alkylation}
49/06	. . containing platinum group metals or compounds thereof	57/02	. with polymerisation
49/08	. . containing crystalline alumino-silicates, e.g. molecular sieves	59/00	Treatment of naphtha by two or more reforming processes only or by at least one reforming process and at least one process which does not substantially change the boiling range of the naphtha
49/10	. with moving solid particles	59/02	. plural serial stages only
49/12	. . suspended in the oil, e.g. slurries	59/04	. . including at least one catalytic and at least one non-catalytic reforming step
49/14	. . according to the "moving-bed" technique	59/06	. plural parallel stages only
49/16	. . according to the "fluidised-bed" technique	61/00	Treatment of naphtha by at least one reforming process and at least one process of refining in the absence of hydrogen
49/18	. in the presence of hydrogen-generating compounds, e.g. ammonia, water, hydrogen sulfide	61/02	. plural serial stages only
49/20	. . Organic compounds	61/04	. . the refining step being an extraction
49/22	. Separation of effluents	61/06	. . the refining step being a sorption process
49/24	. Starting-up hydrotreatment operations	61/08	. plural parallel stages only
49/26	. Controlling or regulating	61/10	. processes also including other conversion steps
50/00	Production of liquid hydrocarbon mixtures from lower carbon number hydrocarbons, e.g. by oligomerisation	63/00	Treatment of naphtha by at least one reforming process and at least one other conversion process (C10G 59/00, C10G 61/00 take precedence)
50/02	. of hydrocarbon oils for lubricating purposes	63/02	. plural serial stages only
Multi-step processes		63/04	. . including at least one cracking step
NOTE		63/06	. plural parallel stages only
Groups C10G 51/00 - C10G 69/00 cover only those combined treating operations where the interest is directed to the relationship between the steps.		63/08	. . including at least one cracking step
51/00	Treatment of hydrocarbon oils, in the absence of hydrogen, by two or more cracking processes only	65/00	Treatment of hydrocarbon oils by two or more hydrotreatment processes only
51/02	. plural serial stages only	65/02	. plural serial stages only
51/023	. . {only thermal cracking steps}	65/04	. . including only refining steps
51/026	. . {only catalytic cracking steps}	65/043	. . . {at least one step being a change in the structural skeleton}
51/04	. . including only thermal and catalytic cracking steps	65/046	. . . {at least one step being an aromatisation step}
51/06	. plural parallel stages only	65/06	. . . at least one step being a selective hydrogenation of the diolefins
53/00	Treatment of hydrocarbon oils, in the absence of hydrogen, by two or more refining processes	65/08	. . . at least one step being a hydrogenation of the aromatic hydrocarbons
53/02	. plural serial stages only	65/10	. . including only cracking steps
53/04	. . including at least one extraction step	65/12	. . including cracking steps and other hydrotreatment steps
53/06	. . . including only extraction steps, e.g. deasphalting by solvent treatment followed by extraction of aromatics	65/14	. plural parallel stages only
53/08	. . including at least one sorption step	65/16	. . including only refining steps
53/10	. . including at least one acid-treatment step	65/18	. . including only cracking steps
53/12	. . including at least one alkaline treatment step	67/00	Treatment of hydrocarbon oils by at least one hydrotreatment process and at least one process for refining in the absence of hydrogen only
53/14	. . including at least one oxidation step	67/02	. plural serial stages only
53/16	. plural parallel stages only	67/04	. . including solvent extraction as the refining step in the absence of hydrogen

67/0409	. . . {Extraction of unsaturated hydrocarbons}	71/00	Treatment by methods not otherwise provided for of hydrocarbon oils or fatty oils for lubricating purposes
67/0418	. . . . {The hydrotreatment being a hydrotreatment}		
67/0427	. . . . {The hydrotreatment being a selective hydrogenation of diolefins or acetylenes}	71/02	. Thickening by voltolising (chemical modification of drying oils by voltolising C09F 7/04)
67/0436	. . . . {The hydrotreatment being an aromatic saturation}	73/00	Recovery or refining of mineral waxes, e.g. montan wax (compositions essentially based on waxes C08L 91/00)
67/0445	. . . . {The hydrotreatment being a hydrocracking}		
67/0454	. . . {Solvent desasphalting}	73/02	. Recovery of petroleum waxes from hydrocarbon oils; Dewaxing of hydrocarbon oils
67/0463	. . . . {The hydrotreatment being a hydrotreatment}	73/025	. . {by filtration}
67/0472	. . . . {The hydrotreatment being a selective hydrogenation of diolefins or acetylenes}	73/04	. . with the use of filter aids
67/0481	. . . . {The hydrotreatment being an aromatics saturation}	73/06	. . with the use of solvents
67/049	. . . . {The hydrotreatment being a hydrocracking}	73/08	. . . Organic compounds
67/06	. . including a sorption process as the refining step in the absence of hydrogen	73/10	. . . . Hydrocarbons
67/08	. . including acid treatment as the refining step in the absence of hydrogen	73/12	. . . . Oxygen-containing compounds
67/10	. . including alkaline treatment as the refining step in the absence of hydrogen	73/14	. . . . Halogen-containing compounds
67/12	. . including oxidation as the refining step in the absence of hydrogen	73/16	. . . . Nitrogen-containing compounds
67/14	. . including at least two different refining steps in the absence of hydrogen	73/18	. . . . containing sulfur, selenium or tellurium
67/16	. plural parallel stages only	73/20	. . . . containing phosphorus
69/00	Treatment of hydrocarbon oils by at least one hydrotreatment process and at least one other conversion process (C10G 67/00 takes precedence)	73/22	. . . . Mixtures or organic compounds
69/02	. plural serial stages only	73/24	. . by formation of adducts
69/04	. . including at least one step of catalytic cracking in the absence of hydrogen	73/26	. . by flotation
69/06	. . including at least one step of thermal cracking in the absence of hydrogen	73/28	. . by centrifugal force
69/08	. . including at least one step of reforming naphtha	73/30	. . with electric means
69/10	. . . hydrocracking of higher boiling fractions into naphtha and reforming the naphtha obtained	73/32	. . Methods of cooling during dewaxing
69/12	. . including at least one polymerisation or alkylation step	73/34	. . Controlling or regulating
69/123	. . . {alkylation}	73/36	. Recovery of petroleum waxes from other compositions containing oil in minor proportions, from concentrates or from residues; De-oiling, sweating
69/126	. . . {polymerisation, e.g. oligomerisation}	73/38	. Chemical modification of petroleum
69/14	. plural parallel stages only	73/40	. Physical treatment of waxes or modified waxes, e.g. granulation, dispersion, emulsion, irradiation
70/00	Working-up undefined normally gaseous mixtures obtained by processes covered by groups C10G 9/00, C10G 11/00, C10G 15/00, C10G 47/00, C10G 51/00	73/42	. Refining of petroleum waxes
70/002	. {by forming adducts or complexes}	73/44	. . in the presence of hydrogen or hydrogen-generating compounds
70/004	. . {with solutions of copper salts}	75/00	Inhibiting corrosion or fouling in apparatus for treatment or conversion of hydrocarbon oils, in general (C10G 7/10, C10G 9/16 take precedence)
70/006	. {with the use of acids or sulfur oxides}	75/02	. by addition of corrosion inhibitors
70/008	. {with the use of organometallic compounds}	75/04	. by addition of antifouling agents
70/02	. by hydrogenation	99/00	Subject matter not provided for in other groups of this subclass
70/04	. by physical processes		
70/041	. . {by distillation}	2300/00	Aspects relating to hydrocarbon processing covered by groups C10G 1/00 - C10G 99/00
70/042	. . . {with the use of auxiliary compounds}	2300/10	. Feedstock materials
70/043	. . {by fractional condensation}	2300/1003	. . Waste materials
70/044	. . {by crystallisation}	2300/1007	. . . Used oils
70/045	. . {using membranes, e.g. selective permeation}	2300/1011	. . Biomass
70/046	. . {by adsorption, i.e. with the use of solids}	2300/1014	. . . of vegetal origin
70/047	. . . {by molecular sieve technique}	2300/1018	. . . of animal origin
70/048	. . {by liquid-liquid extraction}	2300/1022	. . Fischer-Tropsch products
70/06	. . by gas-liquid contact	2300/1025	. . Natural gas
		2300/1029	. . Gas hydrates
		2300/1033	. . Oil well production fluids
		2300/1037	. . Hydrocarbon fractions

C10G

- 2300/104 . . . Light gasoline having a boiling range of about 20 - 100 °C
- 2300/1044 . . . Heavy gasoline or naphtha having a boiling range of about 100 - 180 °C
- 2300/1048 . . . Middle distillates
- 2300/1051 Kerosene having a boiling range of about 180 - 230 °C
- 2300/1055 Diesel having a boiling range of about 230 - 330 °C
- 2300/1059 Gasoil having a boiling range of about 330 - 427 °C
- 2300/1062 . . . Lubricating oils
- 2300/1066 Special oils
- 2300/107 . . Atmospheric residues having a boiling point of at least about 538 °C
- 2300/1074 . . Vacuum distillates
- 2300/1077 . . Vacuum residues
- 2300/1081 . . Alkanes
- 2300/1085 . . . Solid paraffins
- 2300/1088 . . Olefins
- 2300/1092 . . . C2-C4 olefins
- 2300/1096 . . Aromatics or polyaromatics
- 2300/20 . Characteristics of the feedstock or the products
- 2300/201 . . Impurities
- 2300/202 . . . Heteroatoms content, i.e. S, N, O, P
- 2300/203 Naphthenic acids, TAN
- 2300/205 . . . Metal content
- 2300/206 Asphaltenes
- 2300/207 . . . Acid gases, e.g. H₂S, COS, SO₂, HCN
- 2300/208 . . . Sediments, e.g. bottom sediment and water or BSW
- 2300/30 . . Physical properties of feedstocks or products
- 2300/301 . . . Boiling range
- 2300/302 . . . Viscosity
- 2300/304 . . . Pour point, cloud point, cold flow properties
- 2300/305 . . . Octane number, e.g. motor octane number [MON], research octane number [RON]
- 2300/307 . . . Cetane number, cetane index
- 2300/308 . . . Gravity, density, e.g. API
- 2300/40 . Characteristics of the process deviating from typical ways of processing
- 2300/4006 . . Temperature
- 2300/4012 . . Pressure
- 2300/4018 . . Spatial velocity, e.g. LHSV, WHSV
- 2300/4025 . . Yield
- 2300/4031 . . Start up or shut down operations
- 2300/4037 . . In-situ processes
- 2300/4043 . . Limiting CO₂ emissions
- 2300/405 . . Limiting CO, NO_x or SO_x emissions
- 2300/4056 . . Retrofitting operations
- 2300/4062 . . Geographical aspects, e.g. different process units form a combination process at different geographical locations
- 2300/4068 . . Moveable devices or units, e.g. on trucks, barges
- 2300/4075 . . Limiting deterioration of equipment
- 2300/4081 . . Recycling aspects
- 2300/4087 . . Catalytic distillation
- 2300/4093 . . Catalyst stripping
- 2300/42 . . Hydrogen of special source or of special composition
- 2300/44 . . Solvents
- 2300/70 . Catalyst aspects
- 2300/701 . . Use of spent catalysts
- 2300/703 . . Activation
- 2300/705 . . Passivation
- 2300/706 . . Catalytic metal recovery
- 2300/708 . . Coking aspect, coke content and composition of deposits
- 2300/80 . Additives
- 2300/802 . . Diluents
- 2300/805 . . Water
- 2300/807 . . . Steam
- 2400/00** **Products obtained by processes covered by groups [C10G 9/00](#) - [C10G 69/14](#)**
- 2400/02 . Gasoline
- 2400/04 . Diesel oil
- 2400/06 . Gasoil
- 2400/08 . Jet fuel
- 2400/10 . Lubricating oil
- 2400/12 . Electrical isolation oil
- 2400/14 . White oil, eating oil
- 2400/16 . Residues
- 2400/18 . Solvents
- 2400/20 . C2-C4 olefins
- 2400/22 . Higher olefins
- 2400/24 . Acetylene and homologues
- 2400/26 . Fuel gas
- 2400/28 . Propane and butane
- 2400/30 . Aromatics