



JOURNAL OF MOLECULAR CATALYSIS A: CHEMICAL

PatentsALERT

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CATALYST PREPARATION

5879827

Catalyst for membrane electrode assembly and method of making

Debe Mark; Haugen Gregory; Steinbach Andrew; Thomas John; Ziegler Raymond, Stillwater, MN, United States assigned to Minnesota Mining and Manufacturing

Nanostructured elements are provided for use in the electrode of a membrane electrode assembly for use in fuel cells, sensors, electrochemical cells, and the like. The nanostructured elements comprise acicular microstructured support whiskers bearing acicular nanoscopic catalyst particles which may comprise alternating layers of catalyst materials, which may comprise a surface layer that differs in composition from the bulk composition of the catalyst particles, and which may demonstrate improved carbon monoxide tolerance.

5882619

Preparation of a hydrogenation catalyst using $M(OR)_mX_n$

Heineke Daniel; Eller Karsten; Schneider Heinz-Walter; Thome Alfred Ludwigshafen, Germany assigned to BASF Aktiengesellschaft

A carbon-containing catalyst support is prepared by treating the carbon-containing catalyst support with a compound of the formula I (*See Patent for Tabular Presentation*) PS where M is Ti or Zr, X is Cl or Br, and R is C1-C20-alkyl, and m and n are integers from zero to four, where the sum of m and n is equal to four.

5885917

Porous lithium aluminate carrier of spinel structure for catalyst

Ohdan Kyoji; Matsuzaki Tokuo; Hidaka Mikio Yamaguchi, Japan assigned to Ube Industries

A porous lithium aluminate carrier for catalyst has a spinel structure which has a mean pore diameter in the range of 40 to 1000 Å and a total pore volume in the range of 0.2 to 1.5 ml/g. The porous lithium aluminate

carrier can be used for supporting a catalyst compound containing a platinum group metal. The catalyst on the carrier can be favorably employed for promoting catalytic reaction of a nitrite ester and carbon monoxide to prepare a carbonate diester such as dimethyl carbonate.

5885919

Phosphorus/vanadium catalyst preparation

Bortinger Arie Ridgewood, NJ, United States assigned to Scientific Design

The invention provides an improved method for the production of vanadium/phosphorous mixed oxide catalysts, using an organic solvent system and an additive such as dimethyl sulfoxide, the catalyst having special utility in the production of maleic anhydride.

5891821

Aqueous solution for the impregnation of catalytic supports, catalysts prepared from this solution, and application for these catalysts

Poulet Olivier; Bourgogne Michel; Moldan Philippe Ste Croix Sur Aizier, France assigned to Total Raffinage Distribution S A

A novel aqueous solution for the one-step impregnation of catalytic supports, catalysts prepared from such solution, and the preparation and the use of catalysts prepared thereby. The catalysts prepared are used in the hydrotreatment of petroleum fractions and particularly in hydrodesulfurization and/or denitrogenation. The solution is a combination of at least one compound of a metal from group IVa (e.g., Zr), at least one compound of a metal from group VIa (e.g., Mo or W), at least one compound of a metal from group VIII (e.g., Co or Ni), and at least one water soluble amine (e.g., ethylenediamine or MEA).

5892080

Mesoporous crystalline acid composition of a diphosphonate-phosphite of a tetravalent metal which can be used as a catalyst

Alberti Giuli; Vivani Riccard; Vitali Chiara Antonini; Zapelli Piergiorgio Perugia, Italy assigned to Eniricerche

Solid mesoporous crystalline composition of diphosphate-phosphite of a tetravalent metal, with a limited distribution of mesopores having the formula (*See Patent for Tabular Presentation*) PS wherein: M is a tetravalent metal, R is a bivalent organic radical, x varies from 0.3 to 0.6, y varies from 0.05 to 0.3. The process for its production is described, together with its uses and a solid catalyst containing-SO₃H acid groups, active in the conversion processes of hydrocarbons, which can be obtained from the said mesoporous crystalline composition by treatment with a sulfonicphosphonic or arylphosphonic acid, followed, only in the case of treatment with arylphosphonic acid, by sulfonation with a sulfonating agent.

CATALYST REGENERATION

5880049

Regeneration of catalysts for gas phase fluorination

Lacroix Eric; Cheminal Bernard; Requieme Benoit Amberieux d'Azergues, France assigned to Elf Atochem

In order to regenerate the activity of a catalyst for gas phase fluorination the spent catalyst is treated with chlorine and hydrogen fluoride, at a temperature of between 250°C and 450°C.

5880050

Process for the regeneration of catalyst containing sulphur

Boitiaux Jean-Paul; De Bonneville Jean; Burzynski Jean-Pierre; Leger Gerard; Le Peltier Fabienne; Martino Germain Poissy, France assigned to Institut Francais du Petrole

A process for the regeneration of sulfur containing catalysts, wherein the catalyst is stripped of sulfur before the oxychlorination treatment of the regeneration process, typically before the catalyst is sent to the regeneration zone. The process is particularly useful for catalyst employed in hydrocarbon conversions such as dehydrogenation reactions, particularly those which comprise the injection of sulfur and/or at least one sulfur compound before or simultaneously to the introduction of the charge into the first reaction zone.

5883031

Low temperature regeneration of coke deactivated reforming catalysts

Innes Robert A.; Holtermann Dennis L.; Mulaskey Bernard F. San Rafael, CA, United States assigned to Chevron Chemical

A process for regenerating a coke contaminated reforming catalyst comprising platinum on a molecular sieve, said process consisting essentially of contacting said catalyst with a halogen-free oxygen-containing gas at a temperature of less than 780°F for a sufficient period of time such that the aromatization activity is restored to within 20°F of the activity said catalyst possessed at the start of the previous run cycle.

5888919

Process for zeolitic catalyst reactivation

Bartholic David B Watchung, NJ, United States

A spent zeolite-containing hydrocarbon cracking catalyst is treated by regenerating it to remove carbonaceous deposits. A portion of the regenerated catalyst is withdrawn from the circulating catalyst inventory of a hydrocarbon processing unit and slurried with a liquid containing an activating agent to solubilize and/or dislodge contaminants which block the pores of the zeolite and adversely affect the activity of the catalyst. The slurry is agitated to dissolve or dislodge the contaminants from the zeolite pores, and the agitated slurry, without being permitted to settle, is transferred to a fluidized drying zone where the liquid and solubilized and/or dislodged contaminants are removed from the treated catalyst which has a level of cracking activity higher than that of the catalyst in the circulating catalyst inventory. The treated catalyst is then recycled to the unit and contacted with a hydrocarbon feedstock under cracking conditions.

ENVIRONMENTAL CATALYSIS

5879640

Ceramic catalytic converter

Atmur Steven Donald; Strasser Thomas Edward Riverside, CA, United States assigned to Northrop Grumman

A pollutant-reducing catalytic converter for an internal combustion engine. The catalytic converter is of ceramic and operates at higher temperatures for increased efficiency. A ceramic foam is used as the substrate for the catalyst. The foam is an open-celled foam and the substrate is deposited on the walls of the cells. Thus, there is a maximum area of catalyst with a minimum amount of catalyst required. The catalytic converter can be placed in the engine compartment adjacent to the engine for maximum efficiency without causing temperature problems within the engine compartment.

5879645

Method for removing nitrogen oxides in exhaust gas by selective catalytic reduction and catalyst for reduction of nitrogen oxides

Park Sang-Eon; Kim Gyung-Mi; Lee Yun-Jo; Chang Jong-Sa; Han Seong-Hee Daejeon, Republic Of Korea assigned to Korea Research Institute of Chemical Technology

The present invention provides a catalyst for reduction of nitrogen oxides represented by the formula $(AaOx \cdot BbOy)(CcOz \cdot C'c'Oz')/S$ which is produced by supporting mixed metal oxides represented by the formula $(AzOx \cdot BbOy)(CcOz \cdot C'c'Oz')$ in amorphous state on aluminum or silicon-containing support at calcination temperature of 400°C to 700°C. in a molar ratio of 0.01:1 to 5:1, and a method for removing nitrogen oxides through selective catalytic reduction which comprises converting 50 to 50,000 ppm of nitrogen oxides in exhaust gas from automobile or from fixed sources such as plant turbine and boiler, and other industry in a state of having 0.1% to 20% of excessive oxygen over $(AaOx \cdot BbOy)(CcOz \cdot C'c'Oz')/S$ catalyst by using 100 to 100,000 ppm of hydrocarbon reducing agents having 1 to 5 carbons under the reaction condition of 200°C to 800°C of reaction temperature, 1 to 10 atm of reaction pressure and 1000 to 100,000/h of space velocity into nitrogen in which A and B are lanthanide metals, such as lanthanum, cerium, praseodymium or neodymium, and alkali metals or alkaline earth metals, such as sodium, potassium, rubidium, cesium, magnesium, calcium, strontium or barium, C and C' are transition metals of the first period, such as cobalt, copper, nickel, manganese, iron, vanadium, titanium, chromium and zinc, and noble metals, such as

platinum, rhodium, iridium, ruthenium, rhenium, palladium and silver, a , b , c and c' have stoichiometrically 0 to 1, provided with $a + b = 1$, $c + c' = 1$ and is in the range of 0.1–3.0:1.0, and S is aluminum or silicon-containing support, and is zeolite, silica, alumina or silica-alumina.

5880057

Catalyst for exhaust gas treatment and method of preparing the same

Hatano Masaharu Yokohama, Japan assigned to Next Generation Catalyst Research Institute

The disclosed is an exhaust gas treatment catalyst and method therefore, which catalyst comprises a support material selected from the group consisting of elements of Group IIa, Group IIIa, Group IIIb, transition elements and rare earth elements and phosphorus, and an active metal supported on the surface of the support material, improved in high activity and high durability.

5880059

Catalyst for deep oxidation of carbon oxide and organic compounds

Tsyrunikov Pavel Grigorievich; Stuken Sergel Aleksandrovich; Kudrya Elena Nikolaevna; Balashov Vladimir Aleksandrovich; Kachkina Olga Aleksandrovna; Lyubushkin Vladimir Alekseevich; Atamanchuk Oleg Vasilievich Omsk, Russia assigned to Institut Kataliza imeni G K Boreskova Sibirskogo otdelenia Rossiiskos Akademii Nauk

PCT No. PCT/RU96/00114 Sec. 371 Date Dec. 2, 1996 Sec. 102(e) Date Dec. 2, 1996 PCT Filed Jun. 1, 1995 PCT Pub. No. WO95/33560 PCT Pub. Date Dec. 14, 1995. A catalyst for the deep oxidation of organic compounds and carbon monoxide contains 2.7–11.5 mass.% of manganese (with respect to elementary manganese), balance alumina. Manganese stays as non-stoichiometric manganese oxide $\beta\text{-Mn}_3\text{O}_4 + x$, where $0.1 < x \leq 0.25$, containing 80–95% of all manganese atoms, and as manganese aluminate containing 20–5% of manganese atoms. Alumina in the active component is presented by the high temperature forms $\alpha\text{-Al}_2\text{O}_3$ (72–95 catalyst mass.%) and $(\delta + \theta)\text{-Al}_3\text{O}_3$ (28–05 catalyst mass.%). The catalyst

active component has a monolith defect structure, particles size being 50–70 Å. Catalyst phase composition and structure form during its thermal treatment at 900–1000°C.

5882616

Catalyst and method for oxidizing oxygen-containing organic compounds in waste gas

Ziebarth Michael Scott; Libanati Cristian; Uberoi Mohit Columbia, MD, United States assigned to Megtec Systems

The present invention generally relates to supported perovskites of the formula XYO_3 where X is lanthanum, cerium or yttrium and Y is a transition metal such as copper, chromium, manganese, iron, cobalt and nickel supported on a support such as alumina, silica, magnesium aluminate, titanium oxide, zirconium oxide and mixtures thereof. In the case where X is lanthanum, some of the lanthanum ions may be replaced resulting in a perovskite of the formula $La_{1-x}A_xYO_3$ wherein x is about 0.75 or less and A is silver or magnesium and Y is manganese or iron. Their use for low temperature oxidation of volatile organic compounds (VOCs), particularly oxygen-containing VOCs. The support may be stabilized by having an intermediate metal oxide layer on the surface of the support wherein the metal of the intermediate metal oxide may be iron, magnesium, cobalt, nickel, manganese, zinc, titanium, copper, chromium, lanthanum, barium, calcium, strontium or silver. The catalysts contain platinum or palladium. The present invention further relates to the use of supported perovskites to reduce the amount of VOCs present in waste gases produced by processes such as baking, brewing, and flexographic printing. Catalysts prepared from the supported perovskites have increased resistance to poisoning in the presence of sulfur containing compounds.

5883037

Thermally stable/highly reducible catalyst compositions comprising alumina and the oxides of cerium and zirconium

Chopin Thierry; Touret Olivier; Vilmin Gabriel Saint Leu La Foret, France assigned to Rhone-Poulenc Chimie

Thermally stable/highly reducible catalyst compositions, well suited for the catalytic conversion of exhaust

gases emanating from internal combustion engines notably vehicular exhaust gases, comprise alumina, the oxides of cerium praseodymium and zirconium, and, optionally, at least one other oxide of bismuth, of a rare earth, or of an element of group VIII of the Periodic Table, exhibit a stabilized hydrogen-absorption capacity up to a temperature of at least 1000°C.

5883041

Composite catalyst for purifying exhaust gases from carbon monoxide and organic compounds

Pak Vyacheslav Nikolaevich; Kopylov Vladimir Borisovich St Petersburg assigned to Connolly International

A composite active phase/support catalyst for purifying exhaust gases, the active phase of which comprises a solid solution of transition metals oxides with a spinel structure of the formula AB_2O_4 wherein A comprises a combination of metals with their stoichiometric indexes being in the range Zn 0.18–0.21, Cd 0.18–0.21, Co 0.18–0.63, Fe 0.02–0.46, and B also comprises the combination of transition metals with their stoichiometric indexes being in the range Cu 0.09–0.36, Ni 0.09–0.11, Cr 0.24–0.48, Fe 0.28–0.34. The support comprises an oxide carrier coated with oxide layer having a spinel structure of the formula $Cu_{0.33}Co_{0.33}Ni_{0.33}Al_2O_4$ whereas the amount of the active phase per support surface lies in the range 10–12 μmol of AB_2O_4 per 1 m^2 of support surface.

5884474

Method and catalyst unit for treating diesel engine exhaust

Topsoe Haldor Frederik Axel Denmark assigned to Haldor Topsoe

A method for the removal of particulate matter contained in exhaust gas from a diesel fuelled engine. The exhaust gas stream is passed over a carrier having supported thereon one or more inorganic compounds which are in the form of a melt or subcooled melt, the particulate matter in the exhaust gas stream on the melt and/or subcooled melt is adsorbed, the combustibles in the adsorbed particulate matter are burned off, and an exhaust gas stream substantially free of particulate matter is withdrawn.

5888464**Catalyst composition containing an intimately combined cerium-zirconium oxide**

Wu Joseph Hui-Zhao; Wan Chung-Zong; Steger John J
Somerset, NJ, United States assigned to Engelhard

A catalytic material effective for the reduction of NO_x and the oxidation of at least carbon monoxide includes an oxygen storage component that provides superior oxygen storage function. The oxygen storage component includes an intimately combined mixed oxides including cerium, neodymium and zirconium. Typically, the ceria constitutes more than about 30% by weight of the ceria plus zirconia in the intimately combined mixed oxide, e.g., from about 32 to 44 wt.%. Preferably, the intimately combined mixed oxide also includes up to about 26% neodymia by weight of the ceria, e.g., from 18.6% to 23.5%. The intimately combined mixed oxide may be a co-formed material that may be prepared by, e.g., co-precipitating compounds of zirconium and the rare earth metal and calcining the co-precipitate.

5889196**Gas composition sensor and method for separately detecting components of exhaust gas to diagnose catalytic converter performance**

Ueno Sadayas; Ouchi Shirou; Minami Naoki Hitachinaka, Japan assigned to Hitachi; Hitachi Car Engineering

A gas composition sensor for detecting oxygen, and hydrocarbon group fuel or combustible composition produced after combustion having a zirconia solid electrolyte body, a concentration cell composed of a platinum metal catalytic detecting electrode and a reference electrode opposite to each other and a sensing element composed of a gas diffusion limiting member coating the detecting electrode, which further comprises a pair of the sensing elements and heaters for setting both of the sensing elements to operating temperatures different from each other, whereby a specified gas component is selectively detected by operating both of the sensing elements so as to have sensitivity coefficients to the specified gas component different from each other.

5891409**Pre-converted nitric oxide gas in catalytic reduction system**

Hsiao Mark C; Merritt Bernard; Penetrante Bernardino M; Vogtlin George ELivermore, CA, United States assigned to The Regents of the University of California

A two-stage catalyst comprises an oxidative first stage and a reductive second stage. The first stage is intended to convert NO to NO_2 in the presence of O_2 . The second stage serves to convert NO_2 to environmentally benign gases that include N_2 , CO_2 , and H_2O . By preconverting NO to NO_2 in the first stage, the efficiency of the second stage for NO_x reduction is enhanced. For example, an internal combustion engine exhaust is connected by a pipe to a first chamber. An oxidizing first catalyst converts NO to NO_2 in the presence of O_2 and includes platinum/alumina, e.g., Pt/ Al_2O_3 catalyst. A flow of hydrocarbons (C_xH_y) is input from a pipe into a second chamber. For example, propene can be used as a source of hydrocarbons. The NO_2 from the first catalyst mixes with the hydrocarbons in the second chamber. The mixture proceeds to a second reduction catalyst that converts NO_2 to N_2 , CO_2 , and H_2O , and includes a gamma-alumina $\gamma\text{-Al}_2\text{O}_3$. The hydrocarbons and NO_x are simultaneously reduced while passing through the second catalyst.

CHEMICALS**5880058****Rare earth supported catalyst useful for preparation of alkanolamines and process for preparing same**

Moriya Atusi; Tsuneki Hideaki Yokohama, Japan assigned to Nippon Shokubai

A process is provided which comprises using a catalyst comprises a rare earth element supported on an inorganic heat-resisting carrier, when a monoethanolamine is selectively prepared by reacting an alkylene oxide with ammonia in a liquid phase. This catalyst has excellent monoalkanolamine selectivity and heat resistance; and therefore, even when the ratio of ammonia to the alkylene oxide is lower compared with cases where other catalysts are used, an equal or more amount of the monoalkanolamine can be formed, and

thus the recovery cost of the unreacted ammonia is reduced. Further, since the total amount of the feed raw materials is reduced, apparatuses for the reaction system and recovery system can be made smaller, and thus the cost of equipment is reduced.

5880293**Method for catalytic conversion of carbon dioxide**

Godvigovna Tomilova Ralisa; Vladimirovich Ragulin Valerij; Andreevich Lermontov Sergej; Vladimirovich Shkavrov Sergej; Vasilyevna Chornykh Elena; Rudolfovna Kurdyumova Nadezhda; Serafimovich Zefirov Nikolaj Dolgoprudnyj, assigned to Iskra Industry

A process for catalytic conversion of carbon dioxide by reacting it with an olefin oxide in the presence of a catalyst which is a *tert*-butyl-substituted phthalocyanine complex of a metal.

5880315**Catalytic manufacture of vinyl fluoride**

Rao V N Mallikarjun; Subramanian Munirpallam A. Wilmington, DE, United States assigned to E I du Pont de Nemours

A process for the manufacture of vinyl fluoride (i.e., $\text{CH}_2=\text{CHF}$, VF or 1141) from 1,1-difluoroethane (i.e., CH_3CHF_2 , F152a or HFC-152a) is disclosed which involves contacting the 1,1-difluoroethane at an elevated temperature (200–400°C) with a multiphase catalyst composition consisting essentially of (a) fluorides of at least one divalent metal selected from magnesium and zinc, and (b) fluorides of trivalent aluminum, in which phases of the divalent fluorides are homogeneously dispersed with phases of the trivalent fluorides.

5883272**Aluminosilicate carrier for metathesis catalysts**

Noweck Klaus; Hoffmann Andrea Brunsbuttel, Germany assigned to RWE-DEA Aktiengesellschaft fur Mineraloel und Chemie

PCT No. PCT/DE95/01846 Sec. 371 Date Jun. 20, 1997 Sec. 102(e) Date Jun. 20, 1997 PCT Filed Dec. 19, 1995 PCT Pub. No. WO96/19287 PCT Pub. Date Jun. 27, 1996. Rhenium oxide catalysts carried on

aluminium silicates, if required with added boric oxide, tungsten oxide, molybdenum oxide or vanadium oxide for the metathesis of olefins and functionalised olefins, in particular of carboxylic acid esters, are provided, whereby the carrier material was hydrothermally treated.

5883295**Iridium catalyzed carbonylation process for the production of acetic acid**

Sunley John; Watt Robert East Yorkshire, United Kingdom assigned to BP Chemicals

A process for the production of acetic acid comprising carbonylating with carbon monoxide methanol and/or a reactive derivative thereof in the substantial absence of a metal promoter and/or ionic iodide co-promoter in a carbonylation reactor containing a liquid reaction composition comprising an iridium carbonylation catalyst, methyl iodide co-catalyst, water, acetic acid and methyl acetate wherein there is maintained (i) in the liquid reaction composition: (a) water at a concentration of less than 5.0% by weight and (b) methyl iodide at a concentration greater than 12% by weight and (ii) in the carbonylation reactor a total pressure of less than 50 barg.

5886196**Method of catalyzing condensation reactions**

Furbringer Claude Riehen, Sweden assigned to Roche Vitamins

Hydrogen bis(oxalato)borate of the formula (*See Patent for Chemical Structure*) I is used as protonic acid catalyst in condensation reactions, such as Friedel-Crafts condensations, vinyl ether condensations of acetals with vinyl or propenyl ethers and acylations of phenols. The products of such condensations are, for example, dihydro-vitamin K₁ monobenzoate, d,l-alpha-tocopherol, various intermediates in the synthesis of carotenoids as well as d,l-alpha-tocopherol acetate. As a result of the use in accordance with the invention of hydrogen bis(oxalato)borate various disadvantages associated with the use of other protonic acid catalysts, e.g., problems with corrosion, toxicity and environmental contamination, are avoided. The novel catalyst has advantages with respect to selectivity, yields, amounts required as well as working up after completion of the respective condensation.

5888355**Apparatus comprising a catalytic distillation zone comprising a reaction zone with distribution of hydrogen**

Mikitenko Paul; Travers Christine; Cosyns Jean; Cameron Charles; Nocca Jean-Luc; Montecot Francoise; Viltard Jean-Charles; Dorbon Michel; Didillon Blaise Noisy Le Roy, France assigned to Institut Francais du Petrole

The invention concerns a reactive distillation apparatus comprising a distillation zone, associated with a reaction zone which is at least in part internal to said distillation zone and comprises at least one catalytic bed in which the feed is transformed in the presence of a catalyst and at least one gas stream containing hydrogen, characterized in that each catalytic bed in the internal portion of said reaction zone is traversed by said gas stream and liquid in ascending co-current mode. The invention also concerns selective hydrogenation processes for light unsaturated hydrocarbons, mainly any olefins and benzene, comprised in a mixture the major portion of which is constituted by hydrocarbons containing at least five carbon atoms per molecule, and the hydroisomerisation of at least a portion of the 1-butene contained in a feed the major portion of which is constituted by olefinic hydrocarbons including isobutene, also 1-butene and 2-butenes in a ratio which substantially corresponds to the thermodynamic equilibrium.

5888787**Selective enzymatic oxidation of aromatic methyl groups to aldehydes by oxygen in the presence of a laccase-mediator catalyst**

Chen Chen-Loung; Gratzl Josef S; Kirkman Adrianna G; Potthast Antje; Rosenau Thomas Raleigh, NC, United States assigned to North Carolina State University

A method for oxidation of a pendant methyl moiety on an aromatic ring to the pendant aldehyde moiety is presented. The reaction employs laccase and the diammonium salt of 2, 2'-azinobis(3-ethylbenzothiazoline-6-sulfonic acid), and is carried out in the presence of oxygen.

5888923**Modified Raney nickel catalyst and a process for preparing diols by using the same**

Chen Shien Chan; Chu C; Lin F; Chou J Y; Huang C C Taipei, China (Taiwan) assigned to Dairen Chemical

The present invention relates to a modified Raney nickel catalyst which can serve as hydrogenation catalyst for hydroxy aldehydes, such as 4-hydroxy-butanal, and 2-methyl-3-hydroxypropanal and hydroxy cyclic ethers such as 2-hydroxy-tetrahydrofuran. Further, a process for preparing diols by using the modified Raney nickel catalyst is provided.

5889187**Catalytic hydrogenation process and a catalyst for use in the process**

Nguyen Than Canh; Didillon Blaise; Sarrazin Patrick; Cameron Charles La Celle Saint Cloud, France assigned to Institut Francais du Petrole

A process for the selective hydrogenation in the gas phase of acetylene compounds containing two or three carbon atoms to the corresponding ethylene compounds is described. The process uses a catalyst in the form of spherules or extrudates containing palladium, at least one group IB metal, optionally at least one alkaline or alkaline-earth metal and alumina, in which at least 80% of the palladium and at least 80% of the group IB element are present in a volume at the periphery of the catalyst defined between a spherical or cylindrical surface of radius r_1 corresponding to the average spherule or extrudate diameter and a spherical or cylindrical surface of radius r_2 at least equal to $0.8 r_1$. More particularly, the catalyst comprises an alumina, palladium in a proportion of 0.01% to 0.5% by weight, and group IB metal in a proportion of 0.001% to 0.02% by weight, with a weight ratio of group IB

5892049**Catalyst for the production of cyanopyridines**

Hippel Lukas V; Neher Armi; Arntz Dietrich Alzenau, Germany assigned to Degussa Aktiengesellschaft

A method of producing cyanopyridines by means of the catalytic reaction of methylpyridines with ammonia

and oxygen at elevated temperature using catalysts consisting of compounds of the elements antimony, vanadium, silicon, titanium and oxygen and compounds of one or more of the alkali metals as well as a method of producing the catalysts and the catalysts themselves.

5892091**Catalyst for decarbonylation reaction**

Harada Katsumasa; Imbe Yoichi; Nishihira Keigo; Tanaka Shuji; Fujitsu Satoru; Sugise Ryoji; Kashiwagi Koichi; Sumida Toshihiko; Doi Takashi; Nishio Masayuki Yamaguchi, Japan assigned to Ube Industries

A catalyst composed of an organic phosphorus compound having a trivalent or pentavalent phosphorus atom and at least one carbon-phosphorus bonding or a combination of the organic phosphorus compound and a halogen atom-containing compound is effective for decarbonylation, that is, for releasing carbon monoxide from a compound containing a moiety of $-\text{CO}-\text{CO}-\text{O}-$ in its molecular structure.

5892102**Catalyst used in production of carboxylic acid esters and process for producing these esters**

Mikami Yuji; Takeda Akio; Oh-Kita Motomu Otake, Japan assigned to Mitsubishi Rayon

A catalyst for the production of carboxylic acid esters for use in reacting an aldehyde with an alcohol in a liquid phase in the presence of molecular oxygen, comprising calcium carbonate and palladium, bismuth and at least one element selected from the group consisting of barium, iron, zinc and germanium, these elements being supported on said calcium carbonate.

5892108**Method for packing with catalyst for synthesis of unsaturated aldehyde and unsaturated carboxylic acid**

Shiotani Tohru; Sugiyama Miezi; Kuroda Toru; Oh-Kita Motomu Otake, Japan assigned to Mitsubishi Rayon

A method for packing of catalyst, which comprises mixing, into a shaped catalyst containing at least molybdenum and iron, used in the gas-phase catalytic

oxidation of propylene, isobutylene, *tert*-butyl alcohol or methyl *tert*-butyl ether with molecular oxygen to synthesize an unsaturated aldehyde and an unsaturated carboxylic acid both corresponding to the raw material used, metal-made Raschig rings as auxiliary packing material having a bulk volume of 0.3–3.5 times that of the shaped catalyst and a packing density of 0.5–1.5 kg/l, and packing the resulting mixture into a fixed bed type reactor; and a process for producing an unsaturated aldehyde and an unsaturated carboxylic acid, which comprises subjecting propylene, isobutylene, *tert*-butyl alcohol or methyl *tert*-butyl ether to gas-phase catalytic oxidation using molecular oxygen, in a fixed bed type reactor wherein a catalyst is packed by the above method.

5892110**Heterogeneous catalyst for the production of acetic anhydride from methyl acetate**

Ramprasad Dora; Waller Francis Joseph Allentown, PA, United States assigned to Air Products and Chemicals

This invention relates to a process for producing acetic anhydride by the reaction of methyl acetate, carbon monoxide, and hydrogen at elevated temperatures and pressures in the presence of an alkyl halide and a heterogeneous, bifunctional catalyst that contains an insoluble polymer having pendant quaternized phosphine groups, some of which phosphine groups are ionically bonded to anionic Group VIII metal complexes, the remainder of the phosphine groups being bonded to iodide. In contrast to prior art processes, no accelerator (promoter) is necessary to achieve the catalytic reaction and the products are easily separated from the catalyst by filtration. The catalyst can be recycled for consecutive runs without loss in activity. Bifunctional catalysts for use in carbonylating dimethyl ether are also provided.

POLYMERISATION CATALYSIS**5880055****Catalyst for polymerization of ethylene**

Knuutila Hilikka; Sormunen Pekka; Iiskola Eero; Lakomaa Eeva-Liisa; Hokkanen Harri Porvoo, Finland assigned to Neste Oy

The present invention concerns heterogeneous catalysts for polymerization of olefins. The catalysts include at least one Group IVa metal compound on a solid inorganic oxidic support. According to the invention the catalysts are prepared by vapourizing at least one solid Group IVa metal halide compound and routing the vapour of the metal halide compound into a reaction chamber, wherein the vapour is reacted with the support at a temperature of about 250°C to about 450°C. in order to bind said metal halide compound to said support. Any metal compound not bound to said support as well as any volatile reaction products emanating from the reaction between said metal halide compound and said support are then removed from the reaction chamber in the vapour phase. Optionally, the product obtained is treated with an organic aluminum compound to increase the catalytic activity of said catalyst. The catalysts thus prepared are very well suited for polymerization of ethylene or copolymerization of ethylene with other alpha-olefins, such as propylene, butylene, 4-methyl-1-pentene and hexene. A polymerization process employing the novel catalyst will provide products of the Ultra High Molecular Weight-type (UHMWPE) having very broad MWD.

5880056**Olefin polymerization catalyst and process for olefin polymerization**

Tsutsui Toshiyuki; Ohgizawa Masaaki Kuga gun, Japan assigned to Mitsui Petrochemical Industries

Disclosed is an olefin polymerization catalyst comprising (A) a transition metal compound represented by the formula (I) $R_1R_2MX_2$ (wherein M is a transition metal atom, R_1 and R_2 are each a cycloalkadienyl group having an aryl group and a saturated hydrocarbon group as substituents, and X is a halogen atom or the like) and (B) at least one compound selected from (b1) an organoaluminum oxy-compound, (b2) an ionized ionic compound and (b3) an organoaluminum compound. Also disclosed is a process for olefin polymerization comprising polymerizing an olefin in the presence of the above-mentioned catalyst. According to the present invention, an olefin copolymer having a crystallization temperature and a melting point both lower than those of the conventional copolymers can be prepared in the case of that the feeding amount of comonomer is smaller than those conventionally used.

5880251**Polyester synthesis using catalysts having low decomposition temperatures**

Hsu Chih-Pin; Zhao Ming-Yang; Crump L Scott Kansas City, MO, United States assigned to Cook Composites & Polymers

An improved two-stage process for the preparation of polyester resins is provided which involves an initial reaction of a dicarboxylic acid such as isophthalic acid with an alkylene oxide such as ethylene or propylene oxide in the presence of a catalyst to form an oligoester reaction mixture, followed by a second stage reaction between the oligoester reaction mixture and a dibasic acid or anhydride; a first-stage catalyst is employed which has a thermal decomposition temperature substantially at or below the second-stage reaction temperature. The most preferred first-stage catalyst is benzyltriethylammonium chloride.

5883202**Process for olefin polymerization using metallocene catalysts with Lewis acids and aluminum alkyls**

Ewen John A; Elder Michael J Houston, TX, United States assigned to Fina Technology

The invention is a process for using a metallocene catalyst system in polymerization of olefins. The metallocene is contacted with the Lewis acid. The aluminum alkyl is contacted with the olefin. The two mixtures are contacted with each other under polymerization conditions.

5883203**Cofeeds of electron donating and electron withdrawing reagents to control MW in olefin polymerization using supported metallocene catalyst**

Cheruvu Subrahmanyam; Lo Frederick Y; Ong Shih-May Christine Robbinsville, NJ, United States assigned to Mobil Oil

In gas phase polymerizations and copolymerizations of ethylene, reagents or cofeeds control the molecular weight, expressed as MI (wherein MI is measured according to ASTM D-1238 Condition E), of the resin product. Use of isopentane and electron donating compounds decrease MI; whereas, electron withdrawing compounds increase MI.

5883204**Solution polymerization process with dispersed catalyst activator**

Spencer Le; Stevens James C; VanderLende Daniel D
Pearland, TX, United States assigned to The Dow Chemical

A dispersible ionic catalyst activator, comprising an insoluble substrate material having a correlated settling rate less than 0.03 cm/s, and from 0.001 to 10 mmol/g of an ionic catalyst activator deposited thereon which is particularly adapted for use in a continuous, solution polymerization process.

5883205**Process for the preparation of an ethylene copolymer and prepolymerized solid catalyst for olefin polymerization**

Tsutsui Toshiyuk; Yoshitsugu Ken; Ueda Takashi Kuga
gun, Japan assigned to Mitsui Chemicals

The present invention provides an ethylene copolymer comprising constituent units (a) derived from ethylene and constituent units (b) derived from an alpha-olefin having 3 to 20 carbon atoms, the ethylene copolymer being characterized in that (A) the ethylene copolymer has a density (d) of 0.86 to 0.95 g/cm³; (B) the ethylene copolymer has a MFR of 0.001 to 50 g/10 min as measured at a temperature of 190°C and a load of 2.16 kg; (C) the melt tension (MT) and MFR of the ethylene copolymer satisfy the relation (*See Patent for Tabular Presentation*) PS (D) the temperature (T) at which the exothermic curve of the ethylene copolymer measured by a differential scanning calorimeter (DSC) shows the highest peak and the density (d) satisfy the relation (*See Patent for Tabular Presentation*) PS

5886107**Process for hydrogenation of conjugated diene polymers and catalyst composition suitable for use therein assigned to Shell Oil**

The invention provides a catalyst composition suitable for hydrogenation of polymers containing ethylenic unsaturation which comprises at least: (a) a titanium compound of the formula (*See Patent for Chemical Structure*) wherein A_1 represents an optionally substituted heterocyclic five membered ring comprising a

phosphorous or nitrogen heteroatom, and A_2 has the same meaning as A_1 or alternatively represents an optionally substituted cyclopentadienyl group or indenyl group, and wherein L_1 and L_2 may be the same or different and each may be selected from hydrogen, halogen, lower alkyl, phenyl, aralkyl, having from 7 to 10 carbons, lower alkoxy group, phenyloxy, phenylalkoxy group having from 7 to 10 carbon atoms, carboxyl, carbonyl, a $-\text{CH}_2\text{P}(\text{Phenyl})_2$, $-\text{CH}_2\text{Si}(\text{lower alkyl})_3$ or $-\text{P}_2(\text{phenyl})$ group; and (b) an alkalimetal hydride, added as such or prepared in situ in the polymer solution from the alkalimetal terminated living polymer and/or from additionally added alkalimetal alkyl. The invention further provides a process for hydrogenation of polymers containing ethylenic unsaturation.

5886132**Method for controlling the effective level of catalyst during the preparation of a polycarbonate polymer by transesterification**

Varadarajan Godavarthi Satyanarayana; Shimoda Tomoaki; Kanezawa Akio; Minami Satoru Niskayuna, NY, United States assigned to General Electric

A method for determining the effective level of catalyst for the preparation of a polycarbonate polymer by a transesterification reaction is disclosed. The method involves measurement of the leaving group by-product (usually phenol) produced in a test reaction between an aromatic dihydroxy compound and a carbonic acid diester, in the presence of a known amount of transesterification catalyst. The by-product production values can be compared with by-product reference values to calculate the effective level of catalyst. This data can be used to efficiently control catalytic activity in a production scale reaction for producing polycarbonate polymer.

5886133**Production of particular polyesters using a novel catalyst system**

Hilbert Samuel D.; Davis Thomas Jonesborough, TN, United States assigned to Eastman Chemical

This invention relates to a process of producing a moldable polyethylene terephthalate or modified polyethylene terephthalate having an inherent viscosity

greater than 0.6 dl/g comprising reacting the diacid component with the diol component such that a combination of a titanium-based catalyst and a phosphorus-based catalyst is used during the polycondensation steps.

5886224

alpha-diimines for polymerization catalysts

Brookhart Maurice S; Johnson Lynda Kay; Arthur Samuel David; Feldman Jerald; Kreutzer Kristina Ann; Bennett Alison Margaret Anne; Coughlin Edward Bryan; Ittel Steven Dale; Parthasarathy Anju; Tempel Daniel Joseph Chapel Hill, NC, United States assigned to E I du Pont de Nemours; University of North Carolina

Disclosed herein are processes for polymerizing ethylene, acyclic olefins, and/or selected cyclic olefins, and optionally selected olefinic esters or carboxylic acids, and other monomers. The polymerizations are catalyzed by selected transition metal compounds, and sometimes other co-catalysts. Since some of the polymerizations exhibit some characteristics of living polymerizations, block copolymers can be readily made. Many of the polymers produced are often novel, particularly in regard to their microstructure, which gives some of them unusual properties. Numerous novel catalysts are disclosed, as well as some novel processes for making them. The polymers made are useful as elastomers, molding resins, in adhesives, etc. Also described herein is the synthesis of linear alpha-olefins by the oligomerization of ethylene using as a catalyst system a combination a nickel compound having a selected alpha-diimine ligand and a selected Lewis or Bronsted acid, or by contacting selected alpha-diimine nickel complexes with ethylene.

5891816

Single site catalysts with MAO or borate free and their application for polyolefins

Wang Shian-Jy; Chen Yi-Chun; Chan Shu-Hua; Tsai Jing-Cherng; Ting Ching Hsinchu, China (Taiwan) assigned to Industrial Technology Research Institute

A novel organometallic compound is disclosed which can be used, in conjunction with a trialkyl or bialkyl aluminum cocatalyst, for catalyzing the polymerization and copolymerization of ethylene without requiring the use of either methyl aluminoxane or borate as cocata-

lyst. The organometallic compound is represented by the formula of $(CR_5R_nH_5-n)(L)MX_aY_b$; wherein: (a) $C_5R_nH_5-n$ is a substituted or unsubstituted cyclopentadienyl group, in which n is an integer between 0 and 5, and R is C1 to C6 alkyl group; (b) L is tetrapyrazolyl borate, hydrotrispyrazolyl borate, dihydrobispyrazolyl borate or hydrotris(3, 5-dimethylpyrazolyl) borate; (c) M is a Group IIIB, Group IVB, or Group VB transitional metal; (d) a and b are integers such that $a + b = m - 2$, where m is the valance of M; and (e) X and Y, which can be the same or different from each other, are halogen atoms or ligands represented by the formula of ER1, where E is a Group VA or VIA element, and R1 is C1 to C6 alkyl group, aryl group or halogen-substituted aryl group. Preferably, M is a Group IVB transitional metal and $a = b = 1$, and the organometallic compound is then represented by the formula of $(C_5R_nH_5-n)(L)MXY$.

5891976

Catalyst system for the polymerization of olefins, process for this polymerization and polymers thus obtained

Costa Jean-Louis; Pamart Sabine; Hallot Gaetane Grimbergen, Belgium assigned to Solvay Polyolefins Europe-Belgium (Societete Anonyme)

Catalyst systems comprising, on the one hand, a catalytic solid based on complexed titanium trichloride and, on the other hand, a nonhalogenated organoaluminum activator. When employed in gas phase olefin polymerization processes, these catalyst systems make it possible to manufacture a wide range of homopolymers and copolymers (random and block) with an isotacticity index which can be adjusted to very low values and with excellent pourability, even in the case of copolymers of high comonomer content. In the absence of transfer agents they also make it possible to synthesize polymers of very high molecular masses, with an increased activity. These polymerization processes yield particularly advantageous results in the case of propylene.

5891985

Soluble mono-alkyl stannic acid catalyst and its use in preparing high molecular weightpolyesters

Brugel Edward Gus Wilmington, DE, United States assigned to E I du Pont de Nemours

A soluble mono-alkyl Stannic Acid/glycol liquid phase catalyst produced from the reaction of a mono-alkyl Stannic Acid and a glycol at a temperature of from at least 180°C, and its use in preparing high molecular weight polyester polymers.

5892079

Metallocene catalysts and associated methods of preparation and use

Wilson Robert B Palo Alto, CA, United States assigned to SRI International

Novel metallocene compounds are provided which are useful as polymerization catalysts, particularly in the polymerization of addition polymerizable monomers such as olefinic or vinyl monomers. Preferred polymer compositions prepared using the novel catalysts are bimodal or multimodal in nature, typically having a bimodal or multimodal molecular weight distribution. The metallocenes are binuclear or multinuclear, and contain two or more chemically distinct active sites. Methods for synthesizing the novel catalysts are also provided, as are methods for using the novel compounds as homogeneous or heterogeneous polymerization catalysts.

REFINERY CATALYSTS AND PROCESSES

5879539

Precious metal and silica-alumina based catalyst and hydroisomerisation treatment process for heavy feeds

Mignard Samuel; Marchal Nathalie; Kasztelan Slavik; Bigeard Pierre-Henri; Billon Alain Chatou, France assigned to Institut Francais du Petrole

PCT No. PCT/FR95/00352 Sec. 371 Date Apr. 3, 1996 Sec. 102(e) Date Apr. 3, 1996 PCT Filed Mar. 22, 1995 PCT Pub. No. WO95/26819 PCT Pub. Date Oct. 12, 1995. The invention concerns a catalyst for conversion of hydrocarbon feeds. The catalyst is essentially constituted by 0.05% to 10% by weight of a precious metal and a silica (5–70%)/alumina support with a specific surface area of 100–500 m²/g. The catalyst has an average pore diameter of 1–12 nm, the pore volume of pores with diameters between the average diameter ± 3 nm being more than 40% of the total pore

volume. The dispersion of the precious metal is 20–100% and the distribution coefficient for the precious metal is greater than 0.1. The invention also concerns a process for the hydroisomerization of feeds with boiling points of more than 350°C using this catalyst. The process is operated between 200°C and 450°C at 2–25 MPa with a VVH of 0.1–10 h⁻¹ and a hydrogen/feed volume ratio of 100–2000.

5880051

Reforming catalyst system with differentiated acid properties

Chen Qianjun; Bogdan Paula L Des Plaines, IL, United States assigned to UOP LLC

A catalyst system comprising a physical mixture of particles of a non-acidic large-pore zeolite containing a platinum-group metal and particles comprising a refractory inorganic oxide which is metal-free is effective for the reforming of a hydrocarbon feedstock. Reforming of paraffinic feedstocks to effect aromatization, particularly of a raffinate from aromatics extraction, provides improved activity in producing gasoline-range products when using the catalyst system of the invention.

5880324

Catalyst for use in the dehydrogenation and isomerization of paraffins and method

de Agudelo Maria Magdalena; Romero Trino; Guaregua Jose; Gonzalez Marisela Caracas, Venezuela assigned to Intevp

A catalyst comprising a modified mordenite zeolite catalyst modified with Pt and a promoter selected from the group consisting of Group IIB, Group IVA, Group VIB and mixtures thereof is effectively used in a process for the simultaneous dehydrogenation and isomerization of paraffins to isoparaffins and isoolefins under controlled conditions. The catalyst is prepared by depositing on the modified mordenite zeolite catalyst sequentially Pt and thereafter the promoter.

5883032

Selective multimetallic multigradient reforming catalyst

Bogdan Paula; Chen Qianjun Mount Prospect, IL, United States assigned to UOP LLC

A reforming process, selective for the dehydrocyclization of paraffins to aromatics, is effected using a catalyst containing a uniformly distributed platinum-group metal component, a surface-layer metal component comprising one or more of the Group IVA metals and indium and a nonacidic large-pore molecular sieve. The use of this bed of catalyst results in greater selectivity of conversion of paraffins to aromatics and in improved catalyst stability.

5883033**Hydrocarbon conversion catalyst composition and processes therefor and therewith**

Drake Charles A; Wu An-hsian Nowata, OK, United States assigned to Phillips Petroleum

A catalyst composition, a process for producing the composition, and a hydrotreating process for converting a hydrocarbon stream such as, for example, gasoline, to olefins and C₆ to C₈ aromatic hydrocarbons such as toluene and xylenes are disclosed. The catalyst composition comprises a zeolite, a clay, and optionally a coke suppressor and/or an activity promoter. The process for producing the composition comprises the steps: (1) optionally contacting a zeolite with steam whereby a steamed zeolite is formed; (2) optionally contacting a zeolite or the steamed zeolite with an acid to produce an acid-leached zeolite; (3) combining a zeolite, which can also be the steamed zeolite or the acid-leached zeolite, with a clay under a condition sufficient to bind the clay to the zeolite to produce a clay-bound zeolite; and (4) calcining the clay-bound zeolite to produce a calcined clay-bound zeolite. The hydrotreating process comprises contacting a hydrocarbon stream with the catalyst composition under a condition sufficient to effect the conversion of a hydrocarbon to an olefin and a C₆ to C₈ aromatic hydrocarbon.

5883034**Hydrocarbon conversion catalyst composition and processes therefor and therewith**

Drake Charles A; Wu An-Hsian Nowata, OK, United States assigned to Phillips Petroleum

A catalyst composition, a process for producing the composition, and a hydrotreating process for converting a hydrocarbon stream such as, for example, gasoline, to

olefins and C₆ to C₈ aromatic hydrocarbons such as toluene and xylenes are disclosed. The catalyst composition comprises a zeolite, a clay, and a promoter. The process for producing the composition comprises the steps: (1) combining a zeolite with a clay and a promoter under a condition sufficient to bind the clay to the zeolite to produce a clay-bound zeolite; and (2) heating the clay-bound zeolite to produce a modified zeolite. The hydrotreating process comprises contacting a hydrocarbon stream with the catalyst composition under a condition sufficient to effect the conversion of a hydrocarbon to an olefin and a C₆ to C₈ aromatic hydrocarbon.

5883036**Olefin oligomerization catalyst, process for preparing the same, and olefin oligomerization process using the same**

Fujie Hirokaz; Imura Kozo; Matsumoto Hideyuki; Noh Takayuki; Nakanishi Kazuhisa Handa, Japan assigned to KOA Oil

An olefin oligomerization catalyst comprises at least one oxide selected from alumina and silica dotalumina having a sulfate ion supported thereon. The amount of the sulfate ion contained in the catalyst is desirably in the range of 0.3% to 60% by weight based on the total weight of the alumina and/or silica dotalumina and the sulfate ion. The olefin oligomerization catalyst can be readily prepared by bringing a sulfuric acid aqueous solution or an ammonium sulfate aqueous solution into contact with at least one compound selected from alumina, silica alumina and their precursors, followed by drying and calcining. Further, an olefin oligomerization catalyst comprises at least one oxide selected from alumina and silica dotalumina on which a transition metal oxide is further supported in addition to the sulfate ion. By the use of the catalyst, a lower olefin produced in, for example, a petroleum refining process can be converted into an oligomer of high value added.

5883038**Supported catalysts for converting methane or purified natural gas, preparation thereof, and process for preparation of ethylene using said catalysts**

Park Dae Chul; Ahn Pyung Kwon Daejon, Republic Of Korea assigned to Korea Research Institute of Chemical Technology

PCT No. PCT/KR94/00053 Sec. 371 Date Nov. 14, 1995 Sec. 102(e) Date Nov. 14, 1995 PCT Filed May 21, 1994 PCT Pub. No. WO94/27722 PCT Pub. Date Dec. 8, 1994. Supported catalysts of the following formula (I) for preparing ethylene by conversion of methane or purified natural gas and preparation thereof, and process for preparation of ethylene by direct conversion of methane or purified natural gas using said catalysts: (*See Patent for Tabular Presentation*) PS (wherein, M is a compound selected from the group of $\text{RuCl}_2(\text{PPh}_3)_3$, $\text{RuCl}_2(\text{CO})_2(\text{PPh}_3)_2$, $\text{Ru}_3(\text{CO})_{12}$, $\text{RhCl}(\text{CO})(\text{PPh}_3)_2$, $\text{IrCl}(\text{CO})(\text{PPh}_3)_2$, $\text{Pd}(\text{PPh}_3)_4$, $\text{Pt}(\text{PPh}_3)_4$, $\text{RuCl}_3^*x\text{H}_2\text{O}$, $\text{RhCl}_3^*x\text{H}_2\text{O}$, $\text{IrCl}_3^*x\text{H}_2\text{O}$, $\text{PdCl}_2^*x\text{H}_2\text{O}$, $\text{H}_2\text{PtCl}_6^*x\text{H}_2\text{O}$, S is an inorganic carrier selected from $\alpha\text{-Al}_2\text{O}_3$, $\gamma\text{-Al}_2\text{O}_3$, SiO_2 , $\text{SiO}_2\text{-Al}_2\text{O}_3$, Y-zeolite, MgO and TiO_2 , d' is weight percentage of metal in catalyst, ranging from 0.25 to 5 wt.%.

5883039

Alkylation catalyst with non-uniform metal dispersion

McBride Thomas K; Bricker Maureen; Steigleder Karl
Arlington Heights, IL, United States assigned to UOP
LLC

A novel catalyst for alkylating an alkene with an alkane to give an alkylate product has been developed. The catalyst comprises a refractory inorganic oxide on which is dispersed a Group VIII metal, a metal cation and the reaction product of a metal halide and bound surface hydroxyl groups of the refractory inorganic oxide. The catalyst is characterized in that the Group VIII metal is concentrated in an outer layer of the catalyst particle.

5883138

Rapid injection catalytic partial oxidation process and apparatus for producing synthesis gas (law 562)

Hershkowitz Frank; Deckman Harry W; Reynolds Robert P; Gonatas Constantine P; Fulton John W; Schoenman Leonard; Ito Jack I; Clavenna Leroy R
Liberty Corner, NJ, United States assigned to Exxon
Research and Engineering

A novel injector/reactor apparatus and an efficient process for the partial oxidation of light hydrocarbon

gases, such as methane, to convert such gases to useful synthesis gas for recovery and/or subsequent hydrocarbon synthesis. Sources of a light hydrocarbon gas, such as methane, and oxygen or an oxygen-containing gas are preheated and pressurized and injected through an injector means at high velocity into admixture with each other in the desired proportions, at a plurality of mixing nozzles which are open to the catalytic partial oxidation reaction zone of a reactor and are uniformly-spaced over the face of the injector, to form a reactant gaseous premix having a pressure drop through the injector. The gaseous premix is injected in a time period which is less than 5 ms, at a velocity between about 25 to 1000 ft/s, into a reaction zone comprising a catalytic partial oxidation zone so that the gaseous premix reacts in the presence of the fixed catalyst arrangement to reduce the amounts of CO_2 , H_2O and heat produced by the partial oxidation reaction and form, cool and recover a useful syngas.

5885439

Catalytic reforming process with multiple zones

Glover Bryan K Algonquin, IL, United States assigned to UOP LLC

A hydrocarbon feedstock is catalytically reformed in a sequence comprising a first bifunctional-catalyst reforming zone, a zeolitic-reforming zone containing a catalyst comprising a platinum-group metal and a nonacidic zeolite, and a terminal bifunctional catalyst reforming zone. The process combination permits higher severity, higher aromatics yields and/or increased throughput relative to the known art, and is particularly useful in connection with moving-bed reforming facilities with continuous catalyst regeneration.

5885441

Steam conversion process and catalyst

Pereira Pedro; Marzin Roger; Zacarias Lui; Cordova Jose Carrazza Jose; Marino Marian Edo Miranda, Venezuela assigned to Intevep

A process for steam conversion of a hydrocarbon feedstock in the presence of a catalyst includes the steps of (a) providing a catalytic emulsion comprising a water in oil emulsion containing a first alkali metal and a

second metal selected from the group consisting of Group VIII non-noble metals, alkaline earth metals and mixtures thereof; (b) mixing the catalytic emulsion with a hydrocarbon feedstock to provide a reaction mixture; and (c) subjecting the reaction mixture to steam conversion conditions so as to provide an upgraded hydrocarbon product. A catalytic emulsion and process for preparing same are also provided.

5885442

Process for producing petrol of high octane number by catalytic reforming and a reactor for carrying out this process

Lapunow Michael Grigorjewitsch; Abramow Valerie Iwanowitsch; Sommerfeld Volker; Bolsewitsch Peter Wasiliewitsch; Puschkarew Aleksander Petrowitsch Gomel assigned to Lapunow Michael Grigorjewitsch; Abramow Valerie Iwanowitsch; Sommerfeld Volker

PCT No. PCT/EP94/02932 Sec. 371 Date Jun. 28, 1996 Sec. 102(e) Date Jun. 28, 1996 PCT Filed Sep. 2, 1994 PCT Pub. No. WO96/07712 PCT Pub. Date Mar. 14, 1996. The invention relates to a process for producing petrol of high octane number by catalytic reforming of hydrocarbons by passing these hydrocarbons through a platinum/rhenium catalyst arranged in the form of a hollow cylinder at 450–500°C. and a pressure of 1.5–3 MPa in a direction perpendicular to the cylinder axis, in which the feed mixture is passed through in the direction from the cylinder axis to the circumference thereof.

5885443

Reforming with selective multimetallic multigradient catalyst

Bogdan Paula L; Chen Qianjun Mount Prospect, IL, United States assigned to UOP LLC

A reforming process, selective for the dehydrocyclization of paraffins to aromatics, is effected using a catalyst containing a uniformly distributed platinum-group metal component, a surface-layer metal component comprising one or more of the Group IVA metals and indium and a nonacidic large-pore molecular sieve. The use of this bed of catalyst results in greater selectivity of conversion of paraffins to aromatics and in improved catalyst stability.

5888378

Catalytic cracking process

Kowalski Jocelyn Anne Clarksboro, NJ, United States assigned to Mobile Oil

A process for catalytic cracking of a hydrocarbon feedstock feeds to produce an enhanced yield of C3 to C5 olefins comprises contacting the feedstock with a catalyst composition comprising a large pore molecular sieve having a pore size greater than about 7 Angstrom and an additive component comprising a phosphorus-containing zeolite having a Constraint Index of about 1 to about 12 and a crystal size less than 0.2 μm .

5888380

Hydroprocessing catalyst and use thereof

Fujita Katsuhisa; Kamo Tetsuro; Shimowake Masafumi; Inoue Yoshimasa Niihama, Japan assigned to Nippon Ketjen

A catalyst composition suitable for effecting simultaneous hydrodesulphurisation and hydrodemetallisation of sulphur and metals containing feedstocks which shows a high hydrodesulphurisation activity, a high hydrodemetallisation activity, and a long life is disclosed. The catalyst includes: (a) a support, at least 90 wt.% of which includes alumina, which alumina has an R value of from 0.08 to 0.30, the R value being defined as the ratio between the integrated intensity of the X-ray diffraction peak at $2\theta = 32^\circ$ and the integrated intensity of the X-ray diffraction peak at $2\theta = 46^\circ$, (b) from 2 to 8 wt.% of a Group VIB metal component, calculated as metal, (c) from 0.5 to 2.5 wt.% of a Group VIII metal component, calculated as metal; and (d) a pore size distribution as determined by nitrogen adsorption satisfying the following requirements: (i) a pore volume of from 0.5 to 1.0 ml/g, (ii) an average pore diameter of from 18 to 30 nm, and (iii) of the pore volume of pores with a diameter below 60 nm at least 40% is present in pores within a range of the average pore diameter ± 5 nm. A process for use of this catalyst and for its preparation is also disclosed.

5888922

Sulfur tolerant catalyst

Galperin Leonid B Wilmette, IL, United States assigned to UOP LLC

A catalyst system is described and claimed which is useful for various hydrocarbon conversion processes and is tolerant to large amounts of sulfur (about 30,000 ppm sulfur) in the feedstream. The catalyst comprises a first component which comprises at least one Group VIII metal dispersed on an inorganic oxide support and a second component comprising a metal phthalocyanine dispersed on an inorganic oxide support. Preferred Group VIII metals are platinum and palladium, while preferred metal phthalocyanines are cobalt or nickel phthalocyanine. Preferred inorganic oxide supports are molecular sieves, aluminas and mixtures thereof.

5891819

Catalyst comprising hydrogen halide, sulfone, and a promoter

Randolph Bruce B; Abbott Ronald G Bartlesville, OK, United States assigned to Phillips Petroleum

A novel alkylation catalyst is described which is used in processes for alkylating olefin hydrocarbons with isoparaffin hydrocarbons to produce high octane alkylate products suitable for use as a blending component of gasoline motor fuel. The novel catalyst comprises a mixture of a hydrogen halide, a sulfone and a promoter. The novel alkylation catalyst is utilized in a novel process for alkylating olefin hydrocarbons with isoparaffin hydrocarbons.

ORGANOMETALLIC CATALYSIS

5886182

Chiral pyridylphosphines and their application in asymmetric catalytic hydrogenation of 2-arylpropenoic acids

Chan Albert Sun-Chi; Pai Cheng-Chao Kowloon, Hong Kong assigned to The Hong Kong Polytechnic University

Novel, optically active phosphorous compounds of the formula, (*See Patent for Chemical Structure*) wherein R_1 represents hydrogen atoms, straight or branched-chain alkyl groups having from 1 to 6 carbon atoms, R_2 represents hydrogen atoms, halogen atoms, lower alkyl groups (1 to 6 carbon atoms), lower alkoxy groups (1 to 6 carbon atoms), hydroxy group, chiral hydroxyalkyl groups, and amino groups (1° , 2° , 3°)

vinyl groups or allyl groups and R_3 represents phenyl groups, aryl groups, cyclohexyl groups, substituted and unsubstituted cycloalkyl groups, heteroaromatic rings, are described. The compounds of the formula serve as highly useful ligands in the preparation of ruthenium complexes which are effective catalysts for the asymmetric hydrogenation of 2-arylpropenoic acids leading to high valued 2-arylpropionic acids.

5886235

Metal–ligand complex catalyzed processes

Bryant David Robert; Nicholson James Clair; Briggs John Robert; Packett Diane Lee; Maher John Michael South Charleston, WV, United States assigned to Union Carbide Chemicals and Plastics Technology

This invention relates to a process for separating one or more phosphorus acidic compounds from a reaction product fluid containing said one or more phosphorus acidic compounds, a metal–organophosphorus ligand complex catalyst and optionally free organophosphorus ligand which process comprises treating said reaction product fluid with water sufficient to remove at least some amount of said one or more phosphorus acidic compounds from said reaction product fluid.

5886240

Process for preparing aromatic acetylenes using palladacycles as catalysts

Beller Matthias; Reisinger Claus Peter; Herrmann Wolfgang Anton Idestein, Germany assigned to Hoechst Aktiengesellschaft

The invention relates to a process for preparing aromatic acetylenes of the formula (I): $Ar-C\equiv C-R_{8a}$, where Ar is: (*See Patent for Chemical Structure*) by reacting haloaromatics or aryl sulfonates of the formula (II): $Ar-X$, with monosubstituted acetylenes of the formula (III): $Ar-C\equiv C-R_{8a}$, where Ar is defined above and X is bromine, chlorine or OSO_2R , in the presence of a palladium compound catalyst of the formula (IV): (*See Patent for Chemical Structure*) (IV) where R_1 , R_2 , R_3 , R_4 , R_5 , R_6 are, independently of one another, hydrogen (C1–C4)-alkyl, (C1–C4)-alkoxy, fluorine, NH_2 , NH -alkyl-(C1–C4), $N(alkyl)_2$ -(C1–C4), CO_2 -alkyl-(C1–C4), OCO -alkyl-(C1–C4), or phenyl, or R_1 and R_2 , R_2 and R_3 , R_3 and R_4 , R_5 and R_6 , together

form an aliphatic or aromatic ring, and R7, R8 are (C1–C8)-alkyl, (C3–C12)-cycloalkyl, substituted or unsubstituted aryl, and Y is an anion of an inorganic or organic acid.

5892119**Metal–ligand complex catalyzed processes**

Bryant David Robert; Nicholson James Clair; Billig Ernst; Briggs John Robert; Packett Diane Lee; Maher John Michael South Charleston, WV, United States assigned to Union Carbide Chemicals and Plastics Technology

This invention relates to a process for separating one or more phosphorus acidic compounds from a reaction product fluid containing said one or more phosphorus acidic compounds, a metal–organophosphorus ligand complex catalyst and optionally free organophosphorus ligand which process comprises (a) treating said reaction product fluid with water sufficient to remove at least some amount of said one or more phosphorus acidic compounds from said reaction product fluid and (b) treating the water which contains phosphorus acidic compounds removed from said reaction product fluid with an ion exchange resin sufficient to remove at least some amount of said one or more phosphorus acidic compounds from said water.