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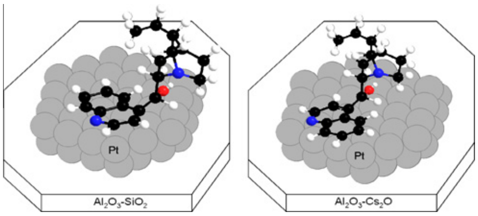
Contents

PRIORITY COMMUNICATION

Metal–support interaction in Pt/alumina: Inversion of diastereoselectivity by tuning the acid–base properties of the support — pp 117–120

Erik Schmidt, Fatos Hoxha, Tamas Mallat, Alfons Baiker*

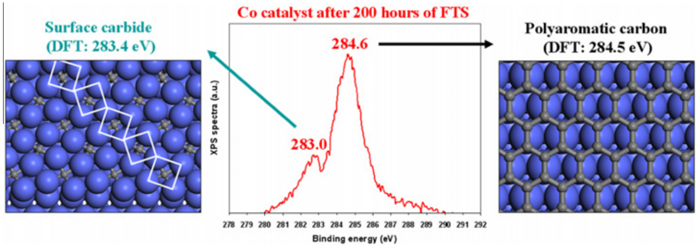


Diastereoselective hydrogenation of cinchonidine revealed that on Pt/alumina and Pt/alumina–silica cinchonidine adsorbs on Pt in pro(*S*) geometry, but doping alumina with only 0.25 wt.% Cs_2O is sufficient to invert the major adsorption geometry to pro(*R*).

REGULAR ARTICLES

Carbon deposition on Co catalysts during Fischer–Tropsch synthesis: A computational and experimental study — pp 121–129

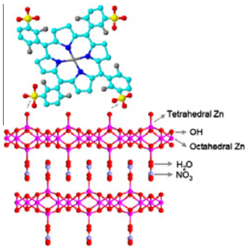
Kong Fei Tan, Jing Xu, Jie Chang, Armando Borgna*, Mark Saeys**



Two forms of resilient carbon were detected on a Co/γ-Al_2O_3 catalyst after Fischer–Tropsch Synthesis (FTS), as illustrated by X-ray Photoelectron Spectroscopy (XPS) and Density Functional Theory (DFT) calculations.

Immobilization of anionic metalloporphyrins on zinc hydroxide nitrate and study of an unusual catalytic activity — pp 130–141

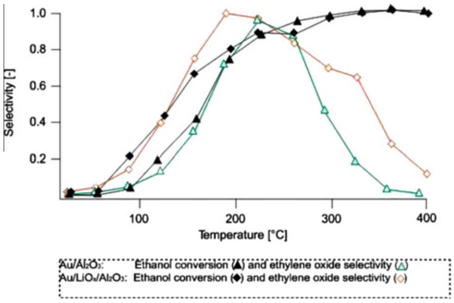
Guilherme S. Machado, Gregório G.C. Arízaga, Fernando Wypych, Shirley Nakagaki*



The catalytic results of the solids obtained by the immobilization of iron porphyrins on zinc hydroxide nitrate, a layered hydroxide salt, in the cyclohexane oxidation, revealed an unusual selectivity for cyclohexanone.

Direct conversion of ethanol into ethylene oxide on gold-based catalysts pp 142–149

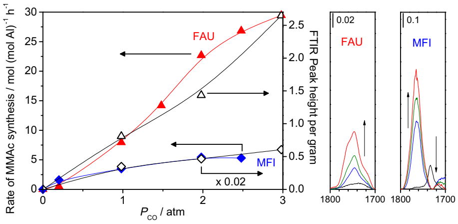
M.J. Lippits, B.E. Nieuwenhuys*



Ethanol can be converted directly to ethylene oxide with high selectivities combined with high conversion on gold-based catalysts.

An investigation into the mechanism and kinetics of dimethoxymethane carbonylation over FAU and MFI zeolites pp 150–162

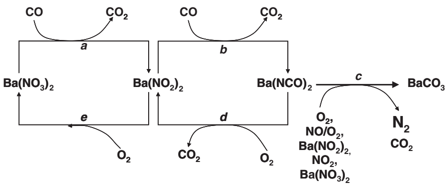
Fuat E. Celik, Taejin Kim, Anton N. Mlinar, Alexis T. Bell*



The mechanisms of dimethoxymethane (DMM) carbonylation and disproportionation over zeolites FAU and MFI were investigated using in situ IR spectroscopy. Rate expressions based upon the reaction pathways deduced from these studies describe the rates of product formation as functions of the reaction temperature and the feed partial pressures of CO and DMM. For both FAU and MFI, the rate of methoxyacetate (MMAc) formation, the product of DMM carbonylation, increased with the intensity of the IR peak for adsorbed methoxymethyl acyl species, the precursor to MMAc, consistent with the proposed mechanism of DMM carbonylation.

Reaction pathway of the reduction by CO under dry conditions of NO_x species stored onto Pt—Ba/Al_2O_3 Lean NO_x Trap catalysts pp 163–175

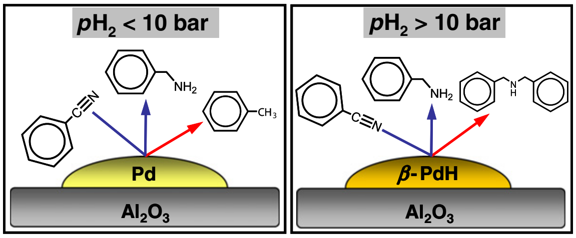
Pio Forzatti, Luca Lietti*, Isabella Nova, Sara Morandi, Federica Prinetto, Giovanna Ghiotti



Reaction pathway in the reduction by CO of nitrates stored onto alumina-supported Pt-Ba catalyst.

Catalyst performance changes induced by palladium phase transformation in the hydrogenation of benzonitrile pp 176–191

Jasper J.W. Bakker*, Anne Geert van der Neut, Michiel T. Kreutzer, Jacob A. Moulijn, Freek Kapteijn

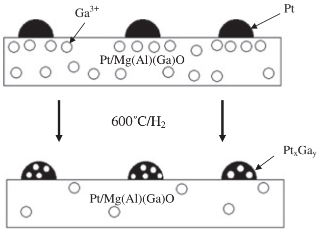


The influence of hydrogen pressure (pH_2) on the performance of a γ-alumina-supported Pd catalyst was studied for the multiphase selective hydrogenation of benzonitrile to benzylamine and byproducts. The transformation to Pd β-hydride (β-PdH) above a threshold pH_2 of 10 bar induces a change in turnover frequency and byproduct selectivity.

Synthesis and characterization of a new catalyst Pt/Mg(Ga)(Al)O for alkane dehydrogenation

pp 192–199

Pingping Sun, Georges Siddiqi, Miaofang Chi, Alexis T. Bell*

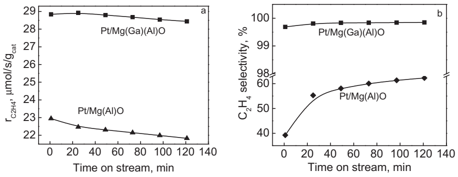


PtGa bimetallic catalysts have been prepared by depositing Pt nanoparticles on the surface hydrotalcite-like supports, Mg(Ga)(Al)O. Upon reduction at 873 K, Ga^{3+} cations at the support surface are reduced to Ga, which then interacts with the Pt nanoparticles to form PtGa alloys. Evidence for PtGa is obtained from EXAFS and STEM-EDX.

Catalyst performance of novel Pt/Mg(Ga)(Al)O catalysts for alkane dehydrogenation

pp 200–206

Georges Siddiqi, Pingping Sun, Vladimir Galvita, Alexis T. Bell*

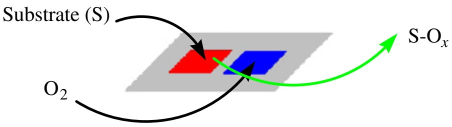


Mg(Ga)(Al)O-supported Pt reduced at 873 K exhibits high activity, selectivity, and stability for the dehydrogenation of ethane and propane. Best performance is achieved for bulk Ga/Pt ratio of 5.4. The presence of Ga significantly reduces the deposition of coke.

Oxygen activation sites in gold and iron catalysts supported on carbon nitride and activated carbon

pp 207–214

Junjiang Zhu*, Sónia A.C. Carabineiro, Dan Shan, Joaquim L. Faria, Yujun Zhu, José L. Figueiredo

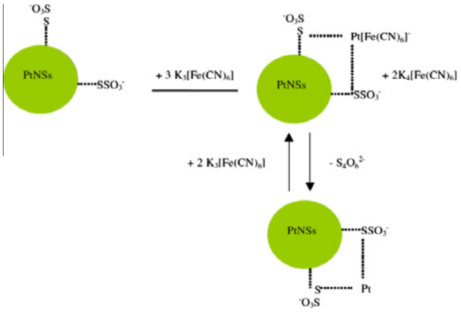


In heterogeneous catalytic oxidation, the adsorption and activation of substrate(s) and molecular oxygen proceeds mainly on the metal and oxygen site of the catalyst, respectively.

Proposed molecular mechanism for the colloidal nanocatalysis of the hexacyanoferrate III–thiosulfate electron transfer reaction: On the involvement of a Prussian blue analogue complex intermediate

pp 215–220

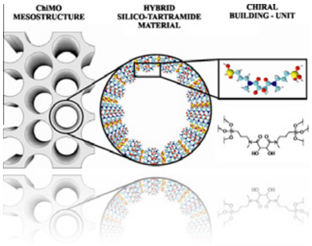
M.A. Mahmoud



Schematic diagrams for the mechanism of the reaction of hexacyanoferrate III and thiosulfate catalyzed by platinum nanostars.

Facile one-pot approach to the synthesis of chiral periodic mesoporous organosilicas SBA-15-type materials — pp 221–227

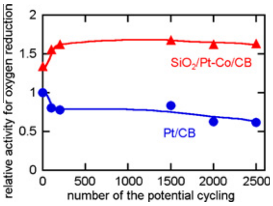
Rafael A. Garcia*, Rafael van Grieken, Jose Iglesias, Victoria Morales, Nelson Villajos



Facile and unprecedented one-pot approach to the synthesis of chiral PMO SBA-15-like material based on a tartrate derivative chiral precursor and on a non-chiral bis-organosilane.

Preparation of supported Pt–Co alloy nanoparticle catalysts for the oxygen reduction reaction by coverage with silica — pp 228–238

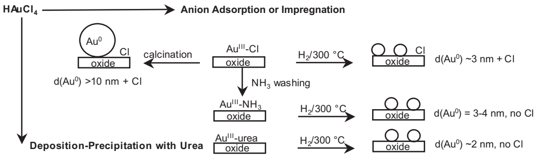
Sakae Takenaka*, Akiko Hirata, Eishi Tanabe, Hideki Matsune, Masahiro Kishida



Coverage of carbon black (CB)-supported Pt–Co catalysts with silica layers prevents aggregation of Pt–Co alloy particles during the treatment at high temperature to allow alloy formation. Thus, the silica-coated Pt–Co catalysts showed high activity and excellent durability for the oxygen reduction reaction.

Advances in the preparation of supported gold catalysts: Mechanism of deposition, simplification of the procedures and relevance of the elimination of chlorine — pp 239–250

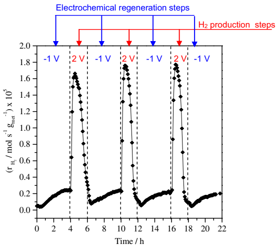
Antoine Hugon, Nadia El Kolli, Catherine Louis*



Gold catalyst preparation by impregnation, anion adsorption and deposition–precipitation with urea: how to get small gold particles and no residual chlorine.

Development of a new electrochemical catalyst with an electrochemically assisted regeneration ability for H_2 production at low temperatures — pp 251–258

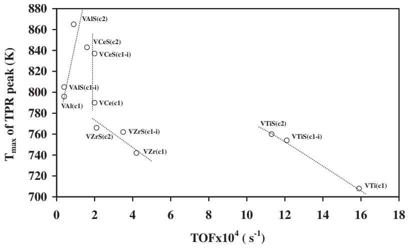
A. de Lucas-Consuegra, A. Caravaca, P.J. Martínez, J.L. Endrino, F. Dorado, J.L. Valverde*



A new electrochemical catalyst has been developed for low-temperature H_2 production from methane, through reforming processes. The application of different potentials allows working in a cyclical way by in situ regenerating the catalyst from carbon deposition under fixed reaction conditions.

Influence of the metal oxide support on the surface and catalytic properties of sulfated vanadia catalysts for selective oxidation of methanol **pp 259–272**

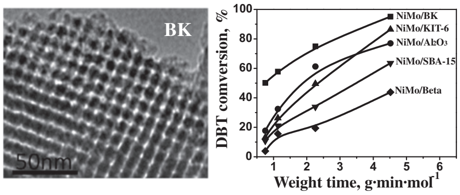
Hongying Zhao, Simona Bennici, Jingxuan Cai, Jianyi Shen, Aline Auroux*



The catalytic reactivity of sulfated vanadia-based catalysts measured in selective methanol oxidation to dimethoxymethane was correlated with the nature and strength of V—O-support and sulfate-support interactions.

Synthesis, characterization, and catalytic performance of NiMo catalysts supported on hierarchically porous Beta-KIT-6 material in the hydrodesulfurization of dibenzothiophene **pp 273–286**

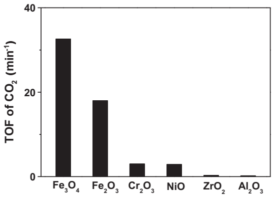
Dengqian Zhang, Aijun Duan, Zhen Zhao*, Chunming Xu*



Micro-mesoporous composite material of Beta-KIT-6 (BK) was successfully synthesized. Superior mass transfer property combined with suitable acidity make Beta-KIT-6-supported NiMo an excellent catalyst for the hydrodesulfurization of dibenzothiophene.

Aqueous-phase reforming of ethylene glycol to hydrogen on Pd/Fe_3O_4 catalyst prepared by co-precipitation: Metal–support interaction and excellent intrinsic activity **pp 287–295**

Jun Liu, Bo Sun, Jiye Hu, Yan Pei, Hexing Li, Minghua Qiao*



The Pd/Fe_3O_4 catalyst prepared by co-precipitation exhibited the best catalytic performance in aqueous-phase reforming of ethylene glycol to H_2 than Pd supported on various metal oxides prepared by incipient wetness impregnation.