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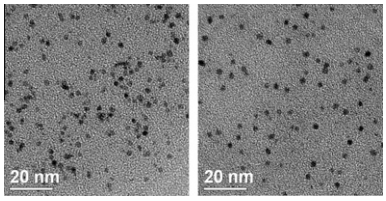
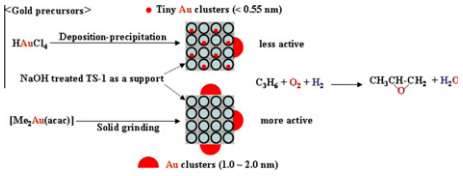
Contents

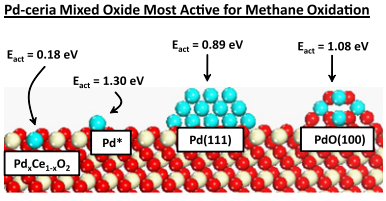
REGULAR ARTICLES



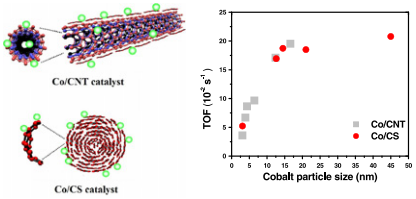
PVP-Pt/Ru colloidal nanoparticles prepared by ethanol reduction exhibit high activity and high selectivity in the selective hydrogenation of *ortho*-chloronitrobenzene to *ortho*-chloroaniline under ambient conditions. TEM photographs of PVP-Pt/Ru nanoparticles: 4Pt/1Ru (left), 2Pt/1Ru (right).



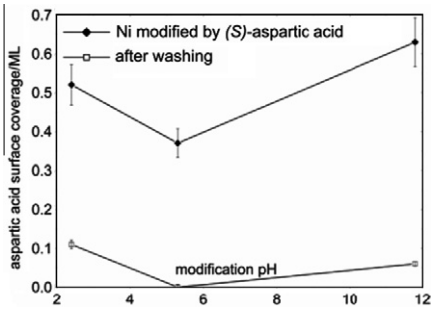
In propene epoxidation with O_2 and H_2, Au clusters (1.0–2.0 nm) on exterior surfaces of TS-1 treated with NaOH were more active than tiny Au clusters (<0.55 nm) inside micropores.



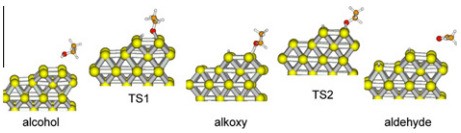
The methane activation barrier over the $Pd_xCe_{1-x}O_2$(1 1 1) surface is lower than that over CeO_2(1 1 1), Pd(1 1 1), or PdO(1 0 0). Methane activation is rate limiting in all cases; thus, the low barrier over $Pd_xCe_{1-x}O_2$ evidences the unique hydrocarbon oxidation activity of Pd/ceria mixed oxides.



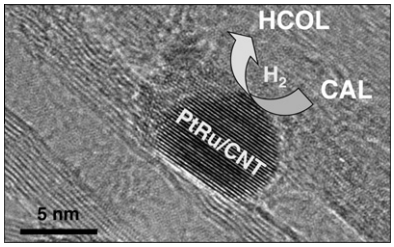
Carbon nanotubes (CNTs) and carbon spheres (CSs) were used to load cobalt with different cobalt particle sizes for use in FTS. The similarities and differences between Co/CNT and Co/CS were investigated.



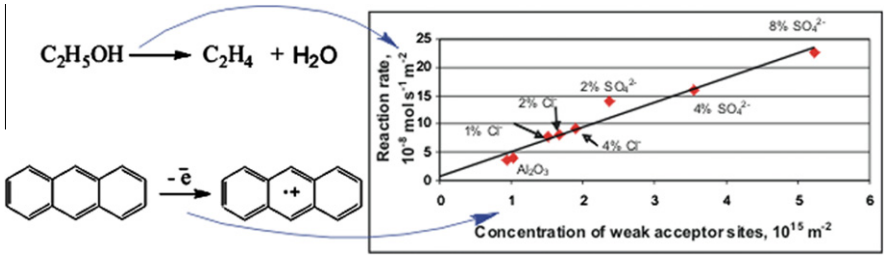
Ni catalysts modified by (S)-aspartic acid exhibit a sharp maximum in enantioselectivity following modification at pH 5.0 and 300 K. XPS shows that under these conditions the coverage of aspartate is vanishingly small implying that enantioselectivity, in this case, may be derived from chiral metal sites created by the corrosive leaching of Ni by aspartic acid.



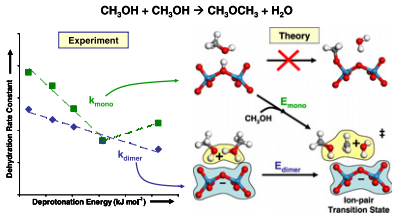
A complete DFT study of the mechanism of selective alcohol oxidation on a series of Au catalyst models suggests that the activity of Au sites inversely correlates with their coordination number. This hypothesis is experimentally confirmed by a kinetic study of benzyl alcohol oxidation on a series of Au/MgO catalyst differing in Au particle diameter and therefore in concentration and distribution of low coordinated Au sites.



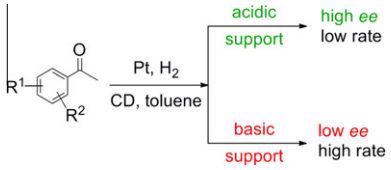
Very active and selective Pt–Ru/CNT catalysts have been prepared for the selective hydrogenation of cinnamaldehyde into cinnamyl alcohol. Characterization using HRTEM, WAXS and EXAFS was indicative of the influence of particles alloying on the selectivity of these systems..



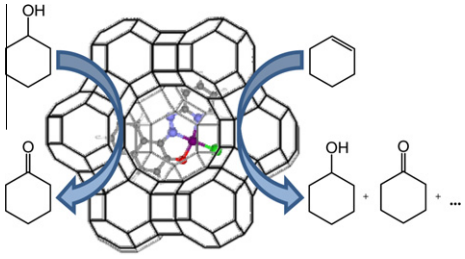
An excellent correlation between the activity of anion-doped alumina catalysts in ethanol dehydration and the concentration of weak acceptor sites capable of ionizing anthracene has been observed.



Dimethyl ether synthesis on solid acids occurs via direct reactions of two co-adsorbed CH_3OH molecules because methyl cations at transition states are effectively solvated by H_2O and CH_3OH molecules. On acids, activation barriers and their sensitivity to acid strength depend on differences in charge distribution and density in adsorbed reactants and their respective transition states.

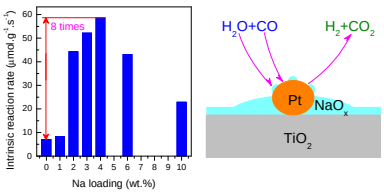


The acid–base properties of the support interaction control the rate and the selectivity of the hydrogenation of acetophenone derivatives to alcohol, and also the adsorption mode and the rate of degradation of cinchonidine (CD) on the Pt surface.

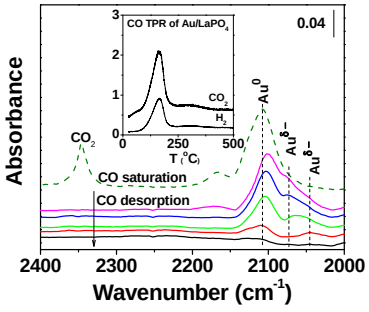


Zeolite-supported transition metal complexes with PAN ligand have been prepared by *flexible ligand* method; these guest–host catalysts are more active in cyclohexanol oxidation than cyclohexene. Heterogenized zinc(II) complex is the best catalyst among the complexes analyzed; in addition, it was shown that it possesses distinct geometrical features.

Mesoporous gallium phosphates synthesized by hydrolysis of gallium alcoxide in the presence of PCl_3 assisted by surfactants form robust structures exhibiting the potential of the aerobic oxidation of toluene.

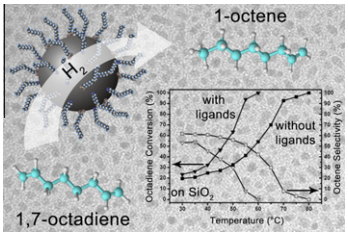


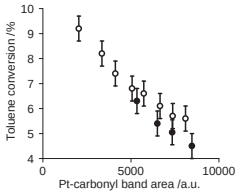
Intrinsic reaction rate and turnover frequency of water gas shift reaction at 300 °C are improved 8 and 11 times, respectively, for Pt/TiO_2 catalyst with optimal Na loading (Na/Pt = 34). Characterizations reveal the strong metal–promoter interactions between Pt and NaO_x are responsible for the significant improvement in activity and stability.



Unexpectedly, CO interacts rapidly with Au/$LaPO_4$ to evolve CO_2 even though the $LaPO_4$ is non-reducible. H_2 evolves with CO_2 during CO-TPR of Au/$LaPO_4$ (but not for Au/$FePO_4$) so surface hydroxyls react to oxidize CO, catalyzed by the Au, a pathway competing with direct CO oxidation.

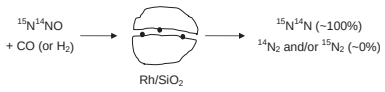
The catalytic properties of identical colloidally synthesized ligand-free and ligand-capped Pt nanoparticles supported on different oxides (γ-Al_2O_3, MgO and SiO_2) were studied under oxidative as well as reductive conditions. In the case of the ligand-free nanoparticles, surface oxidation was observed after deposition in dependence of the support's Brønsted acidity. In contrast, the presence of ligands effectively prevented such a metal support interaction, in turn leading to superior hydrogenation activity at low temperatures (<100 °C). At higher temperatures (~200 °C), spillover of ligands from the nanoparticles to the support led to a decrease of the ligand coverage, resulting in higher CO oxidation activities especially for Lewis acidic supports. The study reveals that organic ligands of colloidally prepared particles are not necessarily detrimental for catalytic activity. In some cases, they can exert a protective function, in other cases spillover onto the support minimizes negative effects resulting from blocking of catalytic sites.



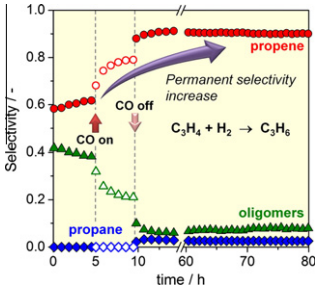


The loss of toluene hydrogenation activity is due to the formation of Pt-carbonyl species when using a CO_2-containing feed.

NOTES



The reduction of $^{15}N^{14}NO$ by carbon monoxide, and also by hydrogen, over a Rh/SiO_2 catalyst yields $^{15}N^{14}N$ as the exclusive nitrogen-containing product. The result rules out a suggestion in the literature that the reduction using carbon monoxide proceeds through cleavage of the nitrogen—nitrogen bond.



Temporary addition of CO during propyne hydrogenation on a copper catalyst permanently boosts the propene selectivity by inducing a smaller ensemble that cuts down the oligomerization path.