Journal of Catalysis 303 (2013) iii–vii

Contents lists available at SciVerse ScienceDirect

Journal of Catalysis

journal homepage: www.elsevier.com/locate/jcat

Journal of Catalysis Vol. 303, 2013

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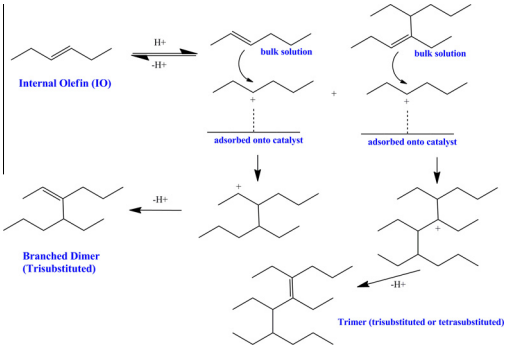
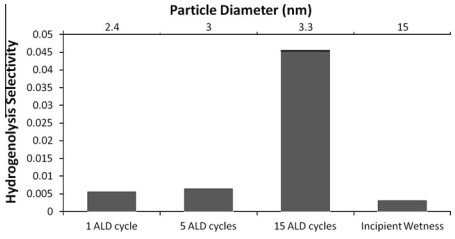
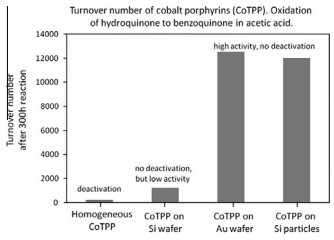
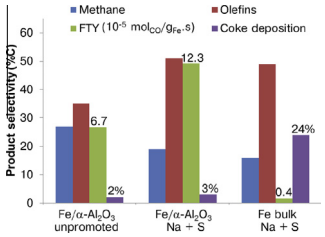




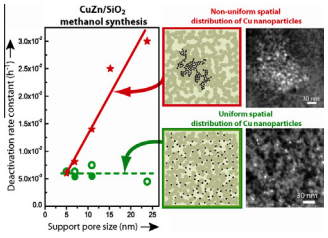
Supported Ni nanoparticles were synthesized via atomic layer deposition (ALD) with average particle sizes ranging from 2.4 to 3.3 nm and Ni weight loadings from 4.7 to 16.7%. This scalable gas-phase technique produced supported catalysts with enhanced propylene hydrogenolysis TOFs and selectivities. Enhanced catalytic activity was attributed to the step and kink defects induced from the small particle size. These defects, along with particle size were shown to vary with the number of ALD cycles.



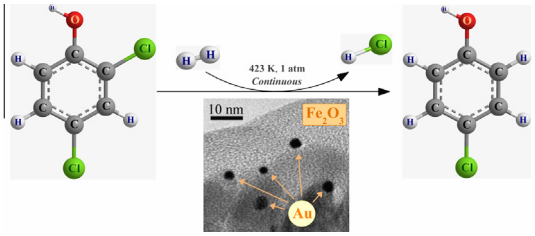
A biomimetic oxidation catalyst, cobalt porphyrin (CoTPP), was chemically grafted on silica particles and further used in oxidation of hydroquinone to benzoquinone. The activity was compared to earlier findings on gold and silicon wafers. It was found that the activity is the same as that on gold wafers, 10 times higher as that on silicon wafers, and it outperformed its homogenous counterpart by a factor of 100.



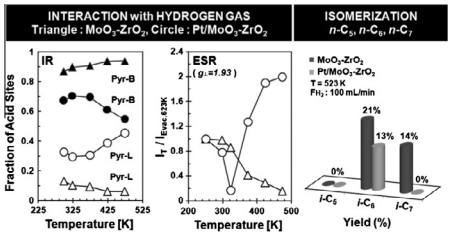
Catalysts promoted with low amounts of sodium and sulfur exhibited higher selectivity to lower olefins and lower methane production. Promoted bulk and α-Al_2O_3-supported catalysts showed similar selectivities; however, bulk catalysts displayed lower catalytic activity and extensive coke formation.



Support pore size and nanospatial distribution of the metal particles cooperatively determine catalyst stability.



Nano-scale Au on Fe_2O_3 promotes selective hydrogenolysis of sterically constrained *ortho*-Cl from 2,4-dichlorophenol in continuous gas-phase operation.



IR and ESR studies showed that the interaction of hydrogen with MoO_3–ZrO_2 formed protonic acid sites and electrons which led to change in the Mo oxidation state, whereas the interaction of hydrogen with Pt/MoO_3–ZrO_2 generated Lewis acid sites. The presence of Pt decreased the activity toward C_5–C_7 linear alkane hydroisomerization.