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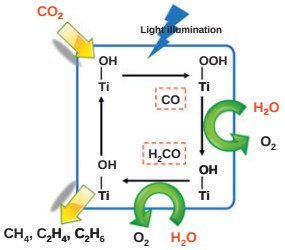
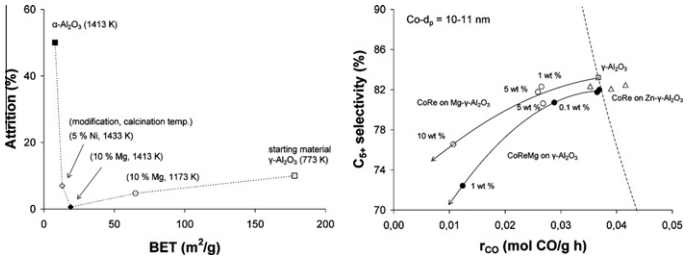
# Contents





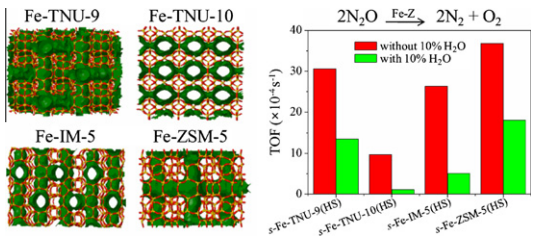

Carbon monoxide and formaldehyde are key intermediates in photocatalytic $CO_2$ reduction over Ti-SBA-15.



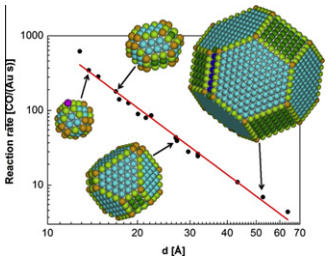



Catalyst attrition as a function of the BET surface area and the $C_{5+}$ selectivity as a function of the reaction rate for Mg, Zn, and Ni modifications.



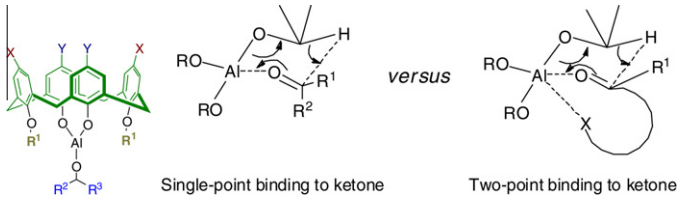



Fe-TNU-9, Fe-TNU-10, and Fe-IM-5 zeolites containing both Fe and Al in framework positions have been hydrothermally synthesized, steam-activated, and tested as catalysts for direct $N_2O$ decomposition. The physical state of iron species in these zeolites before and after steaming has been extensively characterized using various analytical tools.



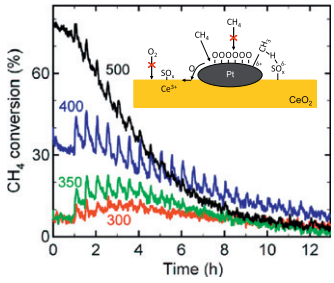

By calculating the atomic-scale shape of gold nanoparticles, and thus the number of catalytically active sites, it is possible to calculate their reactivity. The size dependence of the reactivity is in excellent agreement with experiments, allowing the conclusion that the reactivity is dominated by low-coordinated corner-like atoms.





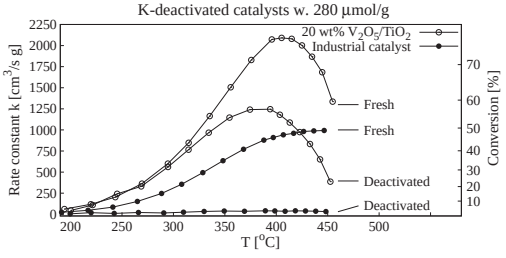

$Al^{(III)}$–calix[4]arene complexes act as site-isolated Lewis acid catalysts for homogeneous MPV reduction. Two-point versus one-point binding of ketone reactant is a crucial feature that controls the catalytic rate and enantioselectivity.



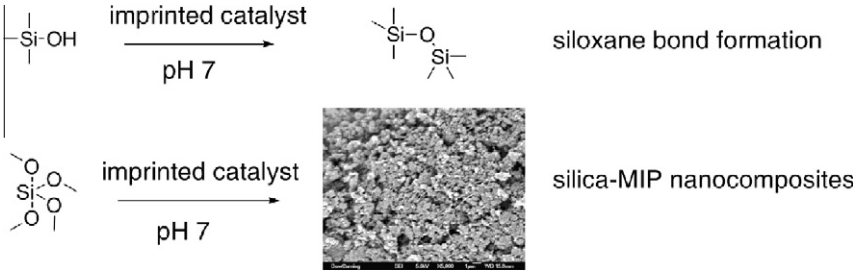



Methane oxidation over $Pt/CeO_2$ which is initially promoted by $SO_2$ pulsing, leading to formation of sulfates that facilitate oxygen spill-over and/or special sites at the platinum–ceria boundary for enhanced methane dissociation, and as a function of time on stream becomes gradually inhibited by sulfur exposure.



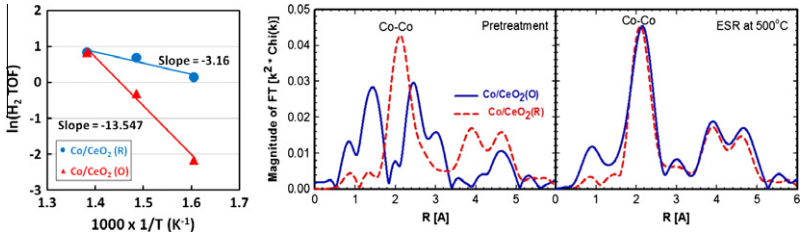



Nano-particle $deNO_X$ catalysts showed high SCR activity and resistivity towards potassium poisoning compared to an industrial reference, upon impregnation by 280 µmole potassium/g of catalyst.



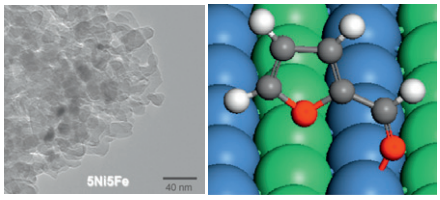

We report the first case of the use of Molecularly Imprinted Polymers for the biomimetic catalysis at silicon centre.





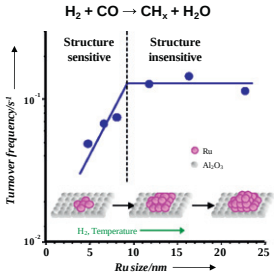

The transformations and state of cobalt species during steam reforming of ethanol were investigated over $Co/CeO_2$ catalysts pretreated with oxidation (O) and reduction (R) steps. Both catalysts were found to transform in situ to the same active phase under reaction conditions, exhibiting both CoO and $Co^0$ species at steady state. The reforming performance of the two catalysts also converged to the same level, giving similar product yields.






Left: TEM image of the NiFe bimetallic catalyst; Right: Optimized structure of furfural adsorbed on NiFe(1 1 1) surface.






Ru size matters: This work investigates the catalytic consequences of Ru cluster size (4–23 nm) in the Fischer–Tropsch Synthesis. This reaction is structure sensitive when Ru < 10 nm: turnover frequency of CO consumption increases as Ru size increases from 4 to 10 nm, reaching a constant value for larger clusters.