

Future Directions in Catalysis Research: Catalysts that Function at the Nanoscale
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CATALYTIC MECHANISMS

- Catalysis is a dynamic phenomenon

high quality structural studies
low quality reactivity studies

e.g., one point measurements of activity/selectivity
rate of activation?
rate of deactivation?

e.g., failure to measure number of active sites

e.g., neglect of mass transport/adsorption effects

- Link between structure and activity is mechanism

relates theory and experiment
focuses design issues

- New methods needed to probe mechanisms

time resolved, in situ spectroscopies (NMR, XAS, INS)
site specific analysis (or uniform sites)
ability to handle air-sensitive materials
isotope jump kinetics

nanomaterials → nanocatalysts