"Influence of solvent-surface interactions on heterogeneous catalysis in porous inorganic oxides"

Liquid phase transformations in porous materials experience strong kinetic effects caused by partitioning of solvents, reactants, and products between the bulk liquid phase and the pores. We probe these effects by measuring the molecular composition of the solid-liquid interface, while simultaneously observing the kinetics of catalytic reactions using operando magic-angle-spinning NMR spectroscopy. The findings shed light on the origin of non-monotonic activity and selectivity trends, as well as changes in mechanism for solid base-catalyzed carbohydrate isomerization and metal-catalyzed hydrogenolysis reactions.

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