

MIT Chemical Engineering Department

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Understanding What Controls the Activity and Selectivity of Heterogeneous Catalysts: Insights Gained from Experiments & Theory



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66-110**

Abstract: Heterogeneous catalysts are involved in producing ~ 90% of the chemicals, polymers, fuels, and pharmaceuticals required by modern societies, and also play a critical role in controlling the emissions of pollutant from industrial plants and automobiles. For these reasons, there is an ongoing interest in understanding how the atomic composition and structure of catalytically active sites affect the overall activity and selectivity of catalysts. This talk will illustrate how modern experimental and theoretical techniques enable access to the desired information for metal, metal oxides, and zeolite catalysts used to promote both thermally and electrochemically driven reactions. These examples will also show that in addition to local site composition and structure, site confinement and electric fields, imposed by either the catalyst lattice or electrolyte cations, influence catalyst activity and selectivity.