Stereochemistry of heterogeneous metal catalysis

Bartok, M., author

Abstrak

The hydrogenolysis and isomerization of methyloxirane and cis- and trans-2,3-dimethyloxirane were studied on Pt, Pd, and Ni catalysts in static and pulse microreactors. On Pt and Pd catalysts, considerable differences could be demonstrated between the rates of transformation of the cis and trans isomers, whereas on Ni catalyst there was scarcely any difference. It may be assumed that in the transformation of the trans isomer on Pt and Pd catalysts the rate-determining step is the formation of the 1,3-diadsorbed surface species; on the Ni catalyst, however, as in the case of 2-methyloxirane and the cis isomer on any of the three catalysts, the rate-determining step is the further reaction of the adsorbed surface species. The results obtained by the pulse reaction technique are indicative of the irreversible adsorption of the reactants. Besides contributing to the clarification of the mechanisms and stereochemistry of the reactions examined, the data obtained give a possibility for the explanation of the fundamental differences in regioselectivity on the Pt, Pd, and Ni catalysts. On Pt and Pd catalysts, the mechanism of formation of 1,3-diadsorbed surface species differs from the mechanism obtained on Ni catalyst.