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Titel des Beitrags: Ring opening of 1,2,3,4-tetrahydroquinoline and decahydroquinoline on MoS2/gamma-Al2O3 and Ni-MoS2/gamma-Al2O3

Abstract: The hydrodenitrogenation of decahydroquinoline (DHQ) and quinoline on MoS2/gamma-Al2O3 and Ni-MoS2/gamma-Al2O3 proceeds via two routes. The first one proceeds via DHQ -> propylcyclohexylamine -> propylcyclohexene -> propylcyclohexane, and the ring opening in DHQ is the rate-limiting step. The second route proceeds via 1,2,3,4-tetrahydroquinoline (14THQ) -> o-propylaniline -> propylcyclohexylamine and propylbenzene with the ring opening of 14THQ and the hydrogenation of o-propylaniline being the rate determining steps (the intrinsic rate of C(sp(3))-N bond cleavage being slower in 14THQ than in DHQ). The active sites for the ring opening via Hofmann elimination are acidic -SH groups and basic S2- ions. The parallel conversion of dibenzothiophene (DBT) via direct desulfurization provides increasing concentrations of S2- ions and -SH groups. Nickel facilitates the adsorption of H2S and H-2 and the mobility of hydrogen. Thus, the presence of DBT and Ni accelerates the rate of the C(sp(3))-N bond cleavage. H2S as sulfur source enhances the ring-opening steps in a minor extent than DBT. The presence of -SH groups and the effect of Ni on them were probed by TPR, TPD and IR-spectroscopy of adsorbed 2,6-dimethylpyridine. (C) 2012
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