

Catalytic hydrogenation–dehydrogenation of aromatic hydrocarbons as a hydrogen source

추고연, 정현도, 김권일, 김태환*, 성재석
한국에너지기술연구원
(thkim@kier.re.kr*)

The dehydrogenation behaviors of bicyclohexane, tercyclohexane and decaline using 5% Pt/Sibunite as a catalyst were investigated. Dehydrogenation reactions were carried out in a special autoclave with hydrogen permeable Pd–Ir membrane in order to prevent the substrates from evaporating at 320 and 380°C. The catalytic reactions of terphenyl hydrogenation–tercyclohexane dehydrogenation over various catalysts were carried out in a 300 ml Parr autoclave due to high boiling point of the substrate. Catalyst suspensions in molten terphenyl or hydrogenated terphenyl were stirred with the help of a magnetic agitator at a constant rate. It was observed that the hydrogenated product consists of 7 main unidentified hydrocarbons which are different from initial o-, m-, p-terphenyls and the appropriate tercyclohexanes in case of using 0.5% Pd/Al₂O₃ (industrial catalyst MA-15) as a catalyst. And the second hydrogenation–dehydrogenation rate was lower than the first cycle. Such an effect may be connected with some deactivation of the catalyst. The hydrogenation rate was proportional to the Pt content of the catalysts. It was shown that the selectivity of the reaction for all the catalysts was near 100%.