Solid Acid Catalyst Prepared by Modifying TiO_2 with Cerium Sulfate for Acid Catalysis of Volatile Organic Chemicals

손종락*, 신동철
경북대학교
(jrsohn@knu.ac.kr*)

An environmently friendly solid acid catalyst, Ce(SO4)2/TiO2 was prepared simply by modifying TiO2 with Ce(SO4)2 for acid catalysis of volatile organic chemicals, 2-propanol and cumene. The characterization of prepared catalysts was performed using FTIR, XRD, and DSC. The surface area of 7-Ce(SO4)2/TiO2 calcined at 300 ℃ was very high (206.0 m2/g) compared to that of unmodified TiO2 (115.2m2/g) due to the interaction between Ce(SO4)2 and TiO2. 7-Ce(SO4)2/TiO2 containing 7 wt% Ce(SO4)2 and calcined at 300 ℃ exhibited maximum catalytic activities for both reactions, 2-propanol dehydration and cumene dealkylation. The catalytic activities for both reactions were correlated with the acid amounts of catalysts measured by an ammonia chemisorption method. The asymmetric stretching frequency of the S=O bonds for Ce(SO4)2/TiO2 catalysts was related to the acidic properties and to the catalytic activity for acid catalysis of volatile organic chemicals, 2-propanol and cumene.