

Synthesis of highly active three-dimensional KIT-6 for the selective oxidation of styrene

김상윤, 제르미, 비네시, 박대원*
부산대학교
(dwpark@pusan.co.kr*)

The direct incorporation of vanadium into the three-dimensional (3-D) cubic Ia3d mesostructure designated as V-KIT-6 was prepared and the material obtained therein showed a very high specific surface area $1000 \text{ m}^2/\text{g}$ with tunable pore diameters in narrow distribution of sizes $\sim 6.0 \text{ nm}$. The extent of mesopore structural ordering was confirmed from X-ray diffraction, N_2 physisorption, SEM, and TEM analysis. The coordination and nature of V sites in V-KIT-6 are characterized by FT-Raman, UV-visible diffuse reflectance, ^{51}V -spin-echo NMR and NH_3 -TPD analysis. It shows that after calcination, the V^{4+} species are totally oxidized to V^{5+} state with 4- and 6- coordinated V-O environments in a highly dispersed state with very less crystalline V_2O_5 formation. The calcined V-KIT-6 materials showed excellent catalytic activity in the direct oxidation of styrene using tert-butyl hydroperoxide (TBHP) as an oxidant.