

Preparation of heteropolyacid catalyst immobilized on the nitrogen-containing mesoporous carbon and its application to the methacrolein oxidation

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Nitrogen-containing mesoporous carbon (N-MC) with high surface area (> 1000 m²/g), large pore volume (> 1.0 cm³/g) and uniform pore size distribution (= 3.8 nm) have been applied for energy storage, electrode materials, and catalyst support due to their unique characteristics such as high conductivity and graphitic nature. N-MC was synthesized using mesoporous silica and polypyrrole as a templating material and a carbon precursor, respectively. N-MC was modified to have positive charge under acidic condition, and thus, to provide sites for the immobilization of H₅PMo₁₀V₂O₄₀. By taking advantage of the overall negative charge of [PMo₁₀V₂O₄₀]⁵⁻, H₅PMo₁₀V₂O₄₀ catalyst was chemically and strongly immobilized on the N-MC surface. In this study, the H₅PMo₁₀V₂O₄₀ catalyst supported on N-MC was characterized and tested as an oxidation catalyst for the vapor-phase methacrolein oxidation reaction. The authors acknowledge the support from Korea Science and Engineering Foundation (KOSEF R01-2004-000-10502-0).