

Highly Ordered Crystalline Mesoporous Metal Oxides as Catalyst for Epoxidation of 1-Octene with Hydrogen Peroxide

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The epoxidation of alkene and cycloalkene has received the great attention in the manufacture of fine chemicals due to the importance of epoxides. Until now, epoxides are produced by a large peracid as oxidant. However, peracid has many disadvantages such as expensive, hazardous, and acid waste. So hydrogen peroxide is an ideal oxidant for epoxidation of 1-octene because of its ease of handling and high activity as oxidant, as well as the fact that byproduct is natural product, namely water.

In this study, to develop catalysts for the epoxidation, the epoxidation reaction of the 1-octene and H_2O_2 as oxidant were carried out. A series of highly ordered mesoporous metal oxides were successfully synthesized using nano-replication method. The catalysts were characterized by X-ray diffraction, N_2 - sorption, scanning electron microscope, and temperature programmed reduction. These mesoporous metal oxide materials exhibit much higher catalytic activities than their bulk counterparts, due to its high surface area. In particular, Such as meso- TiO_2 , meso- WO_3 , meso- MoO_3 show high activities while meso- SnO_2 , meso- NiO , meso- Co_3O_4 show no activity toward epoxidation reaction.