Nano-replication to Mesoporous Metal Oxides using Mesoporous Silica as Template

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Ordered mesoporous silicas such as MCM-41, MCM-48, SBA-15 and KIT-6 have attracted much attention due to their large pore diameters, its many applications as pore structures, selective sorbents and catalyst supports. In addition, mesoporous silicas were used as a template for the synthesis of nanostructured new materials. Recently ordered mesoporous metal oxides have been obtained by usging mesoporous silicas as a template via nano-replication method. These metal oxides have impressive property such as catalytic, optical, electronic materials and so on. And mesoporous metal oxides via nano-replication method have high surface area, mesopore and small size particle.

In this work, we have used mesoporous silica as a template for the fabrication of mesoporous metal oxides. And we successfully synthesized various mesoporous metal oxides. Mesoporous materials such as Fe2O3, MnO2, Mn2O3, Fe2O3-Mn2O3, etc. were obtained by the impregnation with desired metal precursors into the cubic mesoporous silica, crystallization to metal oxides at desired temperature and subsequent silica removal using NaOH aquesous solution. The samples are characterized by using XRD, FESEM, HRTEM and N2 sorption.