

Highly Ordered Mesoporous Spinel Materials : Synthesis, Properties and Analysis

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Mixed Oxides with spinel structure have been under a great deal of attention for decades in the field of electrolytes, electromagnetic devices, refractories, and catalytic material due to their optical, electrical, magnetic, and catalytic properties.

Highly ordered mesoporous AB_2O_4 (A = Mn, Co, Ni, and Zn, B = Mn, Fe, Co) spinel materials have been synthesized through nanocasting method, using KIT-6 silica as a hard template. They were characterized by using X-ray diffraction and N_2 adsorption-desorption isotherms.

From low-angle X-ray diffraction (XRD) patterns of highly ordered mesoporous of AB_2O_4 (A = Mn, Co, Ni, and Zn, B = Mn, Fe, Co) spinel materials, a new (110) peak was observed before $2\theta=1^\circ$. It indicates the meso-structure transformation from cubic to tetragonal or the lower space group after the silica template etching process.

N_2 adsorption-desorption isotherms exhibit the obtained replicas have high specific surface areas (92–125 m^2/g), and large pore volumes (0.11–0.26 cm^3/g).