

Solvent-free infiltration method for mesoporous SnO₂ using mesoporous silica templates

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Tin oxide (SnO₂), with an n-type semiconducting property and a wide band gap (E_g = 3.6 eV), is one of the most promising materials for the applications such as gas sensing, photoelectrochemical devices, energy conversion, and so on. In the present work, the mesoporous SnO₂ materials have been successfully obtained from various kinds of mesoporous silica templates such as KIT-6 (bicontinuous 3-D cubic, *Ia3d*), SBA-15 (2-D hexagonal, *P6mm*), MSU-H (2-D hexagonal, *P6mm*), SBA-16 (discontinuous 3-D cubic, *Im3m*) and spherical mesoporous silica (SMS, disordered) by the nano-replication. Here, we have developed a simple and facile solvent-free infiltration method by using a tin precursor with low melting point around 310 K. The mesoporous SnO₂ materials, thus obtained, exhibit very similar mesostructures as well as morphologies, compared with those of mesoporous silica templates.