

SYNTHESIS
OF NANOTUBES FROM MESOPOROUS
NANOCRYSTALLINE TITANIUM DIOXIDE

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S u m m a r y

Mesoporous nanocrystalline TiO₂ (the anatase phase with spherical crystallites smaller than 10 nm and with the pore diameter larger than 17 nm) is obtained by the sol-gel synthesis followed by a hydrothermal treatment. It is used for the fabrication of titanate nanotubes using the hydrothermal process in a concentrated aqueous NaOH solution at 130 °C. The SEM, TEM, XRD, and nitrogen adsorption-desorption methods were used to study the texture and morphology of new materials. Uniform nanotubular open-ended particles characterized by an average outer diameter of about 8 nm and a length larger than 1 μm are observed. The particles are assembled into bundles about 64 nm in diameter, and the bundles were also aggregated. The calcination of titanate nanotubes in air at 300 °C gave rise to the formation of the anatase phase (the size of crystallite was 5.7 nm), which was accompanied by a reduction of the specimen specific surface area from 255 to 190 m²/g.