

Synthesis of Titania Nanostructured Materials via Nonsurfactant Hydrothermal Route

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Recent efforts in the field of nanostructured materials have been mostly focused on fabricating one-dimensional (1-D) nanowires, rods, or tubes. The synthesis of a material with a well-defined nanoscale cavity is under most currently intensive investigation because of their unique physical properties and wide-range applications in diverse area. In this current study, titania nanostructured materials have been synthesized by hydrothermal treatment of titanium oxysulfate in aqueous nonsurfactant solution. This process is more convenient than template methods in which special templates are required which then have to be removed. And titanium oxysulfate is the intermediate product in TiO_2 manufacturing processes, and so using titanium oxysulfate is lower cost route than using a crystalline titania or titanium alkoxides as making a titania nanotube by hydrothermal method. In addition, the products made by hydrothermal methods without surfactants can prepare the nanotubes with thin walls thickness and small diameters. As-synthesized titania nanomaterials have a large surface area, and so directly usable because of no template in its core. This low-cost simple synthetic method may be applied in the fabrication of some other oxide nanostructured materials.