

Silica Nanoparticle Assisted Synthetic Route to Crystalline Mesoporous Titania

의윤연, 이형익¹, 손정국, 김성수, 김명실, 권영욱, 김지만*
성균관대학교; ¹University of California, Santa Barbara
(jimankim@skku.edu*)

Crystalline titania nanoparticle is one of the most important wide band gap semiconductors and is widely investigated for use in water photoelectrolysis, photocatalysis, heterojunction solar cells, environmental purification and gas sensing. Especially, mesoporous titania has very large surface area, so it can be used for various application area such as transparent conducting oxide for application in solar cell research area as a electrode or catalyst for photocatalytic reaction. Mesoporous crystalline titania with controllable 30- to 250- angstrom pores have been prepared. The crystallization of titania via hydrothermal reaction of titania nanoparticle (TNP) with silica nanoparticle (SNP) is used in this work. In this synthetic route, silica nanoparticles act as an regulator of the crystal growth of titania nanoparticle. Crystal growth of titania nanoparticle is interrupted by attached silica nanoparticles, and crystal growth direction of the titania nanoparticle is restricted. Because of this, the mesopores generated between the titania during the crystal growth. And mesopore size is affected by the amount of added silica nanoparticle.