

### Novel preparation of nano-sized $\text{TiO}_2$ and $\text{ZrO}_2$ particles by nanocasting with nanoporous $\text{SiO}_2$ and selective dissolution

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High surface area nanoparticles can show unique physicochemical properties different from bulk one. A rather broad size distribution of nanoparticles has been one of large problems occurred during the synthesis using metal alkoxides, metal salts etc. Recently, nanoporous silica has been explored as host or template for the preparation of inorganic and organic nanoporous materials. Nanoporous was prepared cerium oxide when the cerium salt was impregnated onto the SBA-15, and subsequently crystallized with ammonia vapor under ambient condition. In this work, we prepared high surface  $\text{TiO}_2$  and  $\text{ZrO}_2$  nanoparticles inside the SBA-15. The result of XRD showed that the  $\text{TiO}_2$  particles had *anatase* structure with wide line broadening. HRTEM micrographs of the  $\text{TiO}_2$  sample indicated the formation of nanoparticles with a well-defined crystal structure, *anatase*. Similarly, the obtained  $\text{ZrO}_2$  was found to have *tetragonal* structure referred from the XRD spectrum. The scanning electron microscophs showed the formation of the aggregate of nanoparticles of  $\sim 10$  nm.