

Synthesis and photocatalytic activity of Titania Nanoparticle Arrays templated by
amphiphilic
POEM-b-PS-b-POEM triblock Copolymer
Thin Films

고주환, 박정태, 노동규, 고종관, 김종학*
연세대학교 화공생명공학과
(jonghak@yonsei.ac.kr*)

A novel ABA-type triblock copolymer, i.e. poly(oxyethylene methacrylate)-b-polystyrene-b-poly(oxyethylene methacrylate) (POEM-b-PS-b-POEM) was synthesized via ATRP. This amphiphilic triblock copolymer was used to template the growth of TiO_2 from a titanium isopropoxide through sol-gel process in the solid state film. The hydrophilic titania precursor was selectively incorporated into hydrophilic POEM domains and formed TiO_2 nanoparticle arrays, mostly due to microphase separation between the PS domains and the POEM/ TiO_2 domains. High-density arrays of TiO_2 nanoparticles with 30 - 40 nm size after calcinations at 550 °C were confirmed by XPS, UV-visible spectroscopy, WAXS and TEM. The resultant TiO_2 nanoparticles showed high photocatalytic activity on the photodegradation of humic acid.

This work was supported by the Korea Science and Engineering Foundation(KOSEF) grant funded by the Korea government(MEST) (No. R01-2008-000-10112-0)