

Controllable Dispersibility of Surface Modified CeO₂ Synthesized by Continuous Supercritical Hydrothermal Synthesis

Agung Nugroho, 밤방, 김재훈*, 김재덕

KIST

(jaehoonkim@kist.re.kr*)

The surface-modified CeO₂ nanoparticles has been synthesized in continuous flow reactor using supercritical water and methanol at 400 oC, 30 MPa and residence time ~40 s with addition of surface modifier. In this study, we use PEG600, PEG350 and decanoic acid as surface modifier. The results of SEM and TEM pictures showed that the addition of surface modifier changed the size and morphology of the obtained nanoparticles. X-ray diffraction spectra revealed that the synthesized nanoparticles were in CeO₂ phase, while Fourier transform infrared spectroscopy and thermal gravimetric analysis indicated that functional group of surface modifier was chemically bonded onto the surface of the nanoparticles. The UV dispersability test for 30 days showed that surface modified CeO₂ have good dispersability in common solvent like water, oil, or ethylene glycol. This result indicated that CeO₂ particles can be dispersed in common solvent by attaching suitable functional group of surface-modifier to the surface of nanoparticles.