

Size-controlled synthesis of nano α -alumina particles through the sol–gel method.

ABSTRACT

Nano α -alumina particles were synthesized by a sol–gel method using aqueous solutions of aluminum isopropoxide and 0.5 M aluminum nitrate. 1/3-benzened disulfonic acid disodium salt (SDBS) and sodium bis-2-ethylhexyl sulfosuccinate (Na(AOT)) were used as surfactant stabilizing agents. Solution was stirred for different periods (24, 36, 48 and 60 h) at 60 °C. The samples were then analyzed by X-ray diffraction (XRD), scanning electron microscopy (SEM) and transmission electron microscopy (TEM). Introduction of surfactant stabilizing agents and different stirring times will affect the size and shape of particle formed and also the degree of aggregation. SDBS, however, produced better dispersion, finer particles and spherical shape nanoparticles, compared to Na(AOT). The finest particle size (20–30 nm) was obtained at 48 h stirring time with SDBS surfactant.

Keyword: Aluminum; Gels; Nanostructured materials; Scanning electron microscopy; Sol-gel process.