

Preparation of Nano-Scale α -Al₂O₃ Powder by the Sol-Gel Method.

ABSTRACT

Sol-gel method was applied to synthesize ultrafine nano α -alumina particles using aqueous solutions of aluminum isopropoxide and 0.5 M aluminum nitrate hydrate. Sodium dodecylbenzen sulfonate and Sodium bis-2ethylhexyl sulfosuccinate were also used as surfactant stabilizing agents. The prepared solution was stirred for 48 hours at 60°C, then, the resultant gelled mass was dried at 90°C, and finally, calcined at 1200°C for about 1 hour. The samples were characterized by different techniques such as, Brunauer-Emmet-Teller method, X-ray diffraction, Thermogravimetry analysis, Differential Scanning Calorimetry, Fourier transform infrared spectra, Scanning electron microscopy and Transmission electron microscopy. The results indicated that the addition of sodium dodecylbenzen sulfonates and sodium bis-2ethylhexyl sulfosuccinate not only affected the particle size and shape of the produced nanoparticles but also the degree of aggregation. However, sodium dodecylbenzen sulfonate produced better dispersion and finer particles, in range of 20-30 nm, compared to Sodium bis- 2ethylhexyl sulfosuccinate.

Keyword: Nano particle; Ceramic alumina; Sol-gel methods