

Synthesis, characterization, and growth mechanism of α -Cr₂O₃ monodispersed particles

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ABSTRACT

Monodispersed spherical particles of chromium (III) oxide, α -Cr₂O₃, were successfully synthesized from a diluted solution of KCr(SO₄)₂ · 12H₂O using the Aqueous Chemical Growth (ACG) technique. The spherical α -Cr₂O₃ particles obtained were characterized by X-ray diffraction (XRD), Scanning Electron Microscopy (SEM), and Raman spectroscopy for structural, surface morphological, chemical, and physical properties, as a function of deposition time. The XRD and Raman spectroscopy showed that aging had no apparent effect on the structure of the obtained uniform fine (in the range of micron- nano-level)-spherical particles of α -Cr₂O₃. The use of SEM demonstrated that aging had a clear influence on the size and the particles size distribution. Accordingly, the time dependence of the average diameter of α -Cr₂O₃ spherical particles follows the d³ law as required for diffusion-limited Ostwald ripening.