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# Effect of Aging Time on CeO2 Nanoparticle Size Distribution Synthesized via Sol-Gel Method

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**Abstract :** Cerium oxide (CeO2) also known as cerium dioxide or ceria is a pale yellow-white powder with various applications in the industry from wood coating to cosmetics, filtration, fuel cell electrolytes, gas sensors, hybrid solar cells and catalysts. In this research, attempts were made to synthesize and characterization of CeO2 nano-particles via sol-gel method. In addition, the effect of aging time on the size of particles was investigated. For this purpose, the aging times adjusted 48, 56, 64, and 72 min. The obtained particles were characterized by x-ray diffraction spectroscopy (XRD), scanning electron microscopy (SEM), transmitted electron microscopy (TEM), and Brunauer–Emmett–Teller (BET). As a result, XRD patterns confirmed the formation of CeO2 nanoparticles. SEM and TEM images illustrated the nano-particles with cluster shape, spherical and a nano-size range which was in agreement with XRD results. The finest particles (7.3 nm) was obtained at the optimum condition which was aging time of 48 min, calcination temperature at 400 $^{o}$C, and cerium concentration of 0.004 mol. Average specific surface area of the particles at optimum condition was measured by BET analysis and recorded as 47.57 m2/g.

**Keywords :** aging time, CeO2 nanoparticles, size distribution, sol-gel
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