

Preparation and characterization of ceria nanofibers obtained by electrospinning

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Cerium oxide nanofibers have been of great interest in fundamental level study. We fabricated polyvinylpyrrolidone (PVP) and cerium nitrate nanofibers composite applying a mixed solution of PVP and cerium nitrate hydrate ($\text{Ce}(\text{NO}_3)_3$) with various cerium concentration from 8.87 to 35.5wt% by electrospinning process. Electrospinning method is a simple and cost-effective process to make nano- and submicro nanofiber fabrication. We applied 0.69 kV/cm of electric field between the capillary and a drum collector covered with aluminum foil. Cerium oxide nanofibers were obtained after calcination of PVP/ $\text{Ce}(\text{NO}_3)_3$ nanofibers composite at 573, 873 and 1273K, which were chosen by thermal gravimetry analysis. The obtained nanofibers were characterized by scanning electron microscopy (SEM), X-ray photoelectron spectroscopy (XPS). When the viscosity of the electrospinning solution was high named over 60 cP, only nano and submicro-sized cerium oxide fibers were collected. X-ray photoelectron spectroscopy (XPS) was performed for investigation of the chemical nature of the obtained ceria nanofibers. After we calcined the PVP/ceria nanocomposites, metallic cerium was oxidized to cerium oxide including ceria.