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The effect of different annealing period intervals on BaAl2O4:0.2% Ce3+ nano-phosphor' structure, morphology and luminescent properties synthesized by citrate sol-gel method.

Tuesday, 26 June 2018 15:00 (2 hours)

Cerium-doped Barium Aluminate (BaAl2O4:0.2%Ce3+) nano-powders were prepared by citrate sol-gel method to overcome the flickering luminescence in signage and displays by offsetting dark duration with persistent luminescence. The effects of annealing period (AP) at a constant temperature of 900 ºC and dopant concentration of 0.2% Ce3+ on the structure, particle morphology and photoluminescent properties of nano-powders were investigated. The X-ray powder diffraction (XRD) patterns showed that the 0.2% Ce3+ dopant did not have a major influence on the crystalline structure of the host BaAl2O4. The crystalline quality and size of the nano-powders ware influenced by varying the AP. The scanning electron microscope (SEM) together with the energy dispersive spectra (EDS) images revealed the increase in AP affects the morphology of the prepared phosphor. There is a presence of hexagonal platelets with well-developed faces that dominate the morphology of the doped samples. The emission peaks at 427 nm, 538 nm and 727 nm are attributed to band-gap defects in the host material at λex = 299 nm. The emission peaks at 481 nm, 549 nm and 612 nm are attributed to the 5d⊠4f emission of Ce3+. The commision internationale de l'eclairage (CIE) results showed the there is a slight change in the emission color of 0.2% Ce3+ doped BaAl2O4 when varying the AP.

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