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Synthesis and characterization of doped perovskite oxides (CaTiO3: Pr, Al) nanophosphors by using sol-gel method.

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Abstract content
   (Max 300 words)
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Perovskite calcium titanate (CaTiO3) nanoparticles were successfully prepared by wet-chemical method (sol-gel route), using calcium nitrate and titanium (IV) isopropoxide as starting material and acetic acid as complexing reagent. A sol was obtained and then oven heated to form a gel which was calcined at high temperature (800 ℃ for 2hours) to obtain a crystalline CaTiO3 powder. Red emitting nanophosphors of CaTiO3:Pr3+ with various particle sizes were prepared by sol-gel methods and structurally characterized by X-ray diffraction and the particle size, morphology, optical properties of calcined nanoparticles was investigated by scanning electron microscopy and photoluminescence. XRD spectra confirm a crystal system of CaTiO3 to be orthorhombic structure and a particle size in nanometer scale, the PL spectrum has a strong peak at 613 nm for the excitation at 310 nm originating from 1D2-3H4 transition of Pr3+. SEM micrograph indicates the shape of the crystals and the morphology of the nanomaterial. This study shows that various properties can be tuned for suitable advanced applications. Perovskite phosphors are widely used in plasma display panels (PDPs), and field emission displays (FEDs), luminous paint as well as safety indicator. The results suggested that the calcination temperature plays an important role in the particle size effect of nanocrystalline, enhancement of the red emissions of Pr3+ doped CaTiO3 with addition trivalent aluminium ions (Al3+) as co-dopant.

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