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LUMINESCENCE PROPERTIES OF CaMoO4 DOPED Dy3+

Material Physics focuses on synthesis and characterization of materials for different applications, such like tunable color iluminants, LED applications, construction, and even medicine. Keeping this in mind, the incorporation of rare earths as crystal impurities in the host material is quite important, because it could change the electrical and optical properties in order to favor its emission. In particular, Dy3+ doped materials have been studied and proposed for modulable white LED applications, among these, CaMoO4: Dy has become of interest for many researchers due to its lumninescence and thermoluminescence properties. This work shows the synthesis and spectroscopic characterization of CaMoO4 doped with different molar concentrations of Dy3+, in order to determine which, one gives the best emission. The synthesis was performed by the solvent evaporation technique from appropriate solution of calcium chloride hexahydrate and sodium molybdate dihydrate, using deionized water as solvent, according to equation (1):

$$CaCl2 \quad 6H2O + Na2MoO4 \quad 2H2O \rightarrow CaMoO4 + 2NaCl + 8H2O \quad (1)$$

The solution was heated and stirred simultaneously at a temperature of 80 ℃ for 1 hour until the solvent was evaporated, leaving a precipitate of CaMoO4. At last, the sample was placed in a muffle oven at 700 ℃ for 8 hours in order to get the crystalline structure. XRD and Raman were used as characterization techniques for CaMoO4 doped with different concentrations of Dy3+ in order to verify that the compound was correctly synthesized. Photoluminescence emission was measured showing interesting results.

Keywords

Luminiescence, Thermoluminescence, Crystalline, Raman, XRD

Reference

Laguna, M. (et al.). Morphology control of uniform CaMoO4 microarchitectures and development of white light emitting phosphors by Ln doping (Ln = Dy3+, Eu3+). The Royal Society of Chemistry: CrystEngComm, Vol. 12, 1590-1600. (2017) doi: 10.1039/C6CE02611G

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Author approval

I confirm

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