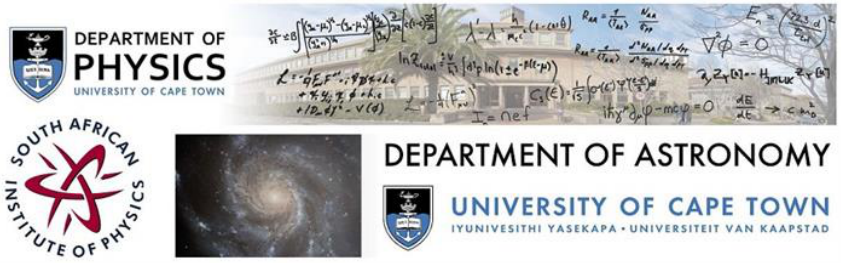

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Investigation of Luminescence Properties of Dy3+ Doped different Alkaline based White-light emitting Phosphors

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Abstract content
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Dy3+ doped different alkaline based sodium-phosphate (NaMPO4, where M= Mg, Ca, Sr and Ba) phosphors were prepared by solution combustion method. The prepared phosphors were characterized by powder X-ray diffraction, field emission scanning electron microscope (FE-SEM), fluorescent spectrophotometry and UV–vis spectroscopy. The XRD and FE-SEM results confirm that the samples contain mixed phases of crystals. The band gap of the phosphors was calculated from diffuse reflectance spectra data using the Kubelka–Munk function. The excitation spectra of the phosphors showed a broad band extending from 250 to 500 nm, which are characteristics of near ultraviolet (NUV) excitation wavelength for light emitting diode (LED). Upon near-UV excitation, the phosphor emits intense blue and yellow with a weak red band emissions, which originate from 4F9/2⟶6H15/2, 6H13/2, 6H11/2 transitions of Dy3+ ion. Different results on the luminescence features of Dy3+:NaMPO4 will be discussed on the basis of crystal structure. The effect of the Dy3+ concentration on the luminescence properties of NaMPO4:Dy3+ phosphors will also be discussed. The calculated CIE coordinates were found to be lying in the white region of the horse shoe plot of color gamut. All the results imply that the Dy3+:NaMPO4 phosphors could be used as a NUV excited white LEDs.

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