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Synthesis and Photoluminescence Properties of White Emitting Alkaline Earth Chalcogenide Phosphors doped with Sn for Solid State Lighting

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Abstract: *Sn^{2+} doped white emitting alkaline-earth chalcogenide CaS and SrS phosphors were synthesized by carbo-thermal reduction method. In this method special requirement such as H_2S gas flow is not required as a source of sulphur and is comparatively easy method to prepare sulfides. The crystalline phase, morphology, and photoluminescence properties were characterized by x-ray diffraction (XRD), scanning electron microscope (SEM), and fluorescence spectrophotometer, respectively. Phosphors exhibit broad band excitation which has excellent spread over nUV as well as blue region of visible light i.e. 440–480 nm. Emission is in the form of characteristic broad band of Sn^{2+} covering nUV and almost entire regions of visible spectrum i.e. 400–650 nm. The XRD pattern of prepared phosphor well matches with International Center for Diffraction Data. Synthesized phosphor particles are of different sizes, with smooth surfaces, from less than 1 micron to few microns. The chromaticity coordinates of synthesized phosphors have been calculated from its corresponding emission spectra monitored at their excitation wavelengths. They observed to falls in white region of CIE diagram. These points are close to standard white point D65, corresponding to daylight with correlated color temperature (CCT) 6500 °K, indicating better color purity of the synthesized phosphor and they are promising material for a color converter using blue LED as the primary light (pumping) source in phosphor converted white LED (pc wLED) for solid state lighting.*

Keywords: Solid State Lighting; carbo-thermal reduction; white phosphor; photoluminescence; chalcogenide

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