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CHROMATICITY STUDY OF La₂O₃-PVA PHOSPHOR NANOFIBERS PREPARED BY ELECTROSPINNING PROCESS FOR UV LIGHT DOWN CONVERSION FOR WHITE LIGHT EMITTING DIODE

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ABSTRACT- Lanthanum oxide-polyvinyl alcohol (La₂O₃-PVA) phosphor nanofibers had been prepared using electrospinning process with four different thicknesses (2.0, 6.0, 13.0 and 59.0 μm) and each sample with the same thickness was investigated with different annealing temperatures (100, 200, 300 and 500 °C). The phosphor was used for light down-conversion of UV light (365 nm) for fabrication of white light emitting diode (WLED). The resulting phosphor nanofibers were observed and analyzed by X-ray diffraction (XRD), field emission scanning electron microscope (FESEM) and ultraviolet-visible (UV-Vis) spectroscopy. The chromaticity coordinates (CIE) and correlated color temperature (CCT) of the WLED were measured with different thickness and temperature of phosphor nanofibers by using HPC-2 lightsource colorimeter with applied voltage and current of 8.4 V and 0.14 A respectively. The comparison showed that lanthanum oxide-polyvinyl alcohol (La₂O₃-PVA) phosphor nanofibers exhibited CIE values of 0.3575, 0.4308 and CCT of 4835 K. The annealing temperature and thickness of phosphor were confirmed to be major factors that control the intensity of white light emitted from the sample.

Keywords: La₂O₃-PVA, Nanofibers, WLED, HPC-2 lightsource colorimeter.