

Synthesis and Optical Properties of Red-Emitting $\text{BaEu}_x\text{Fe}_{12-x}\text{O}_{19}$ Phosphors

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Abstract—A series of $\text{BaFe}_{12-x}\text{Eu}_x\text{O}_{19}$ ($x=0, 1, 1.25, 1.5, 1.75$ and 2 mol %) hexaferrites were prepared by Solution Combustion Synthesis method. The rietveld analysis confirms that the prepared samples have space group $p6_3/mmc$ and hexagonal structure. Morphological and topological investigations were done by SEM and TEM micrographs. EDX spectrum reveals presence of all the materials in the prepared samples. The FTIR spectra show vibration between the $4f_1$ and $4f_2$ crystallographic sites of the ferric ion. The photoluminescence spectra depict intense emission peak centered on 690nm due to 5D_0 to 7F_4 electric dipole transition of the europium ions. The PL emission intensity increases upto 1.5 mol% doping of europium ions, after that it decreases due to exchange interaction process. Chromaticity investigations confirm that the prepared samples show warm red emission.

Keywords: Photoluminescence; barium hexaferrite; solution combustion; Chromaticity.