

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Synthesis and Characterization of ZnS:Eu³⁺ - CMC nanophosphors emitting white light over broad excitation range DILIP DE, Covenantuniversity, Ota, Ogun State, Nigeria, IKORYA AHEMEN, Department of Physics, University of Agriculture, Makurdi, Benue State, Nigeria, VIENA BRUNO, Laboratoire de Chimie de la Matire Condensee de Paris — In this paper we report for the first time the synthesis and characterization of nanophosphors of ZnS:Eu³⁺ - embedded in sodium carboxymethyl cellulose matrix (CMC) that emits high quality white light over broad range of excitation. The nano-phosphors of cubic (zinc blende) structure were synthesized using precipitation technique with doping concentrations of Eu³⁺ ions 1 mol% and 5 mol%. The crystal sizes were 2.56 nm and 2.91 nm respectively. Annealing at 300 °C in a sulfur-rich atmosphere altered the crystal size to 4.35 nm and 3.65 nm respectively and the band gap from 4.2 eV to 3.76 eV and 3.81 eV respectively. The as-synthesized samples gave pure orange-red emission when excited at wavelengths of 394 nm and 465 nm. After thermal annealing of the samples, a broad emission band in the blue-green region assigned to defect related states emerged or were enhanced. Also enhanced were the emission lines of Eu³⁺ ions in the orange-red region. A combination of these two transitions gave white light of different shades (recorded on the CIE 1931 chromaticity diagram) from cool white through Day-light to warm white light, depending on Eu³⁺ concentration and the excitation wavelengths (UV-330 to blue 465 nm), thus showing great potential applications of these nano-phosphors.

Dilip De
Covenantuniversity, Ota, Ogun State, Nigeria

Date submitted: 01 Dec 2015

Electronic form version 1.4