

CaMgSi₂O₆:Eu²⁺ and Dy³⁺ co doped phosphors prepared by combining two chemical method

C. Yamagata^{1*}, A. M. Misso¹, S. R. H. Mello-Castanho¹, Hermi F. Brito², Lucas C. V. Rodrigues²

¹Instituto de Pesquisas Energéticas e Nucleares, Centro de Ciência e Tecnologia de Materiais, São Paulo, Brazil, ²Universidade de São Paulo, Instituto de Química, SP, Brazil

* Corresponding author: yamagata@ipen.br

Silicate system of the CaO–MgO–SiO₂ has attracted great interest due to its high weather resistance which is endorsed by the physical and chemical stability [1, 2]. This property makes it applicable as host for luminescent materials. CaMgSi₂O₆ (diopside), an important component of the mantle and subduction slabs has been studied by many researchers [3]. Eu²⁺ activated alkaline earth silicate phosphors have a long afterglow characteristic and blue to green emission by the near ultraviolet [4] stimulation. Glass ceramic of CaO–MgO–SiO₂ system has potential application on the optical devices [5, 6], for example, Ca₂MgSi₂O₇:Eu²⁺ [7] and CaMgSi₂O₆:Eu²⁺, Dy³⁺ [8]. Ca₂MgSi₂O₇:Eu²⁺ is a promising phosphor material for white light emitting diode (LED) [5]. In this study, CaMgSi₂O₆:Eu²⁺ and Dy³⁺ co-doped CaMgSi₂O₆:Eu²⁺ phosphors were synthesized using sol gel technique followed by a modified molten salt method and thermal treatment in a weak reducing atmosphere. Crystalline phase identification by XRD and the measurements of photoluminescence (PL) excitation were performed. The XRD results reveal that the synthesized phosphors are crystalline and assigned to the diopside structure. The PL results indicate the emission spectra of CaMgSi₂O₆:Eu²⁺ and Dy³⁺ co-doped CaMgSi₂O₆:Eu²⁺ phosphors have a broad band at 450nm attributed to electronic transition from the 4f⁶ 5d¹ state to the 4f⁷ state.

Keywords: CaMgSi₂O₆:Eu²⁺ (Dy³⁺), phosphors, synthesis, XRD, photoluminescence

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