

### P57 - Long lasting phosphorescence of $\text{Eu}^{2+}$ and $\text{Dy}^{3+}$ ions doped in barium aluminate

Roberval Stefani<sup>1</sup>, Lucas C.V. Rodrigues<sup>1</sup>, Carlos A.A. Carvalho<sup>1</sup>, Hermi F. Brito<sup>1\*</sup>, Cláudia A. Kodaira<sup>2</sup>, Maria Cláudia F.C. Felinto<sup>2</sup>

<sup>1</sup>Departamento de Química Fundamental, Instituto de Química da USP (IQUSP). Av. Professor Lineu Prestes 748, CEP 05508-000 São Paulo, SP, Brasil

<sup>2</sup>Instituto de Pesquisas Energéticas e Nucleares (IPEN / CNEN - SP)

\*hefbrito@iq.usp.br

Rare Earth co-doped aluminates compounds like  $\text{CaAl}_2\text{O}_4:\text{Eu}^{2+}$ ,  $\text{Nd}^{3+}$ ;  $\text{SrAl}_2\text{O}_4:\text{Eu}^{2+}$ ,  $\text{Dy}^{3+}$  and  $\text{BaAl}_2\text{O}_4:\text{Eu}^{2+}$ ,  $\text{Dy}^{3+}$  phosphors [1] has been regarded as useful blue and green phosphors by their long phosphorescence. Long afterglow materials are widely used to illuminate mainly displays in weak light environment [1-3]. The intensity of x-ray diffraction peaks increase with the heating temperature, indicative of crystallinity enhancement of the barium aluminate compound obtained at higher temperatures. XRD patterns of barium aluminate: 1%  $\text{Eu}^{2+}$ , 2%  $\text{Dy}^{3+}$  compound prepared by solid state chemistry with thermal treatment at 250, 700, 1150 and 1500 °C show the formation of different phases according to the temperature. SEM micrographs show agglomerated particles with about 50  $\mu\text{m}$  of size. At lower magnification, a narrow distribution of particles is shown, ranging from 10  $\mu\text{m}$  to 100  $\mu\text{m}$ , the larger grains seeming to be formed by aggregation of several smaller grains. At higher magnification, particles seem to be forming a grain, with dimensions from 1 to 7  $\mu\text{m}$ . Fig. 1 show the phosphorescence spectra of barium aluminates. This emission is due to the  $5d \rightarrow 4f$  transition of  $\text{Eu}^{2+}$  ions. It corresponds to the electronic transition from the  $t_{2g}$  component of the  $4f^65d$  to the ground state  $^8S_{7/2}$  ( $4f^7$ ). The phosphorescence of the  $\text{Eu}^{2+}$  ( $4f^7$ ) and other rare earth luminescence cations centers are associated with the  $(4f)^{n-1}(5d)^1 \rightarrow (4f)^n(5d)^0$  or  $(4f)^{n+1} \rightarrow (4f)^n$  transitions, which are systematically induced by a  $(4f)^n(5d)^0 \rightarrow (4f)^{n-1}(5d)^1$  excitation.

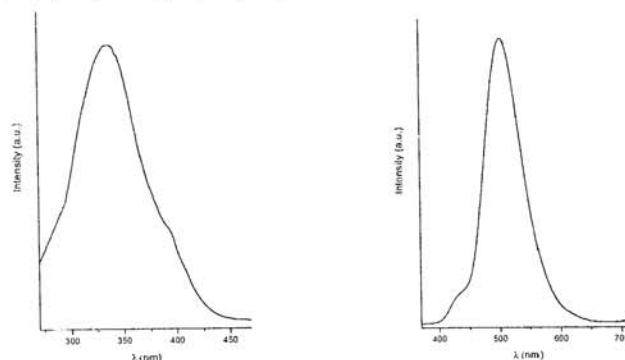


Fig.1. Excitation and emission spectra of the  $\text{BaAl}_2\text{O}_4:\text{Eu}^{2+}$ ,  $\text{Dy}^{3+}$  phosphors.

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