

**LUMINESCENCE PROPERTIES OF 30SrO-30MgO-40P2O5  
DOPED WITH Dy2O3**

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**ABSTRACT**

This paper reports on the luminescence properties of Dy<sup>3+</sup> (1.0 mol%) doped 30SrO-30MgO-40P<sub>2</sub>O<sub>5</sub>, which had been prepared by solid state reaction. The crystalline phases were identified using X-ray diffraction (XRD) and their luminescence properties were studied using excitation and emission spectra obtained from photoluminescence spectroscopy. The results of XRD patterns indicate that the prepared sample contain Mg<sub>2</sub>P<sub>4</sub>O<sub>12</sub> and SrMg P<sub>2</sub>O<sub>7</sub> crystalline phase. The excitation spectrum of 30SrO-30MgO- 40P<sub>2</sub>O<sub>5</sub>: Dy<sup>3+</sup> consist many dominant broad bands' center at ~280,310 and 400-600 nm. The broad band excitation spectrum associated with defects and vacancies of host material through two different crystalline phases present in host material. The other feature of sharp peaks is very similar and belongs to Dy<sup>3+</sup> ions. The observed f-f transitions in the range of 417-475nm correspond to the transitions from 6H<sub>15/2</sub> to 4K<sub>17/2</sub> + 4M<sub>19/2</sub>, 21/2 + 4I<sub>13/2</sub> + 4F<sub>7/2</sub>, 4G<sub>11/2</sub>, 4I<sub>15/2</sub> and 4F<sub>9/2</sub>, in the range of 392nm to 6P<sub>3/2</sub> + 6P<sub>5/2</sub>, and in the range of 312-370nm to 4K<sub>15/2</sub>, 6P<sub>7/2</sub> + 4M<sub>15/2</sub> and 4I<sub>11/2</sub> respectively. The sharp emission peaks like at 482,465, and 455 nm could be assigned to the transition of 4F<sub>9/2</sub>→6H<sub>15/2</sub>, 4I<sub>15/2</sub>→6H<sub>15/2</sub> and 4G<sub>11/2</sub>→6H<sub>15/2</sub> of Dy<sup>3+</sup> respectively. Dy<sup>3+</sup> has emissions due to the atomic energy levels of itself and emissions due to the acceptor levels of defect sites formed by Dy<sup>3+</sup>. In addition, the SrO-MgO-P<sub>2</sub>O<sub>5</sub> is found a new self-active luminescent material.

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