

ABSTRACT:

This paper reports on the luminescence properties of Dy³⁺-doped 30SrO–30MgO–40P₂O₅, 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 crystalline phase of MgP₂O₆ and SrMgP₂O₇. The excitation spectrum of 30SrO–30MgO–40P₂O₅:Dy³⁺ consists of broad bands' centre at ~280, 310 and 400–600 nm associated with defects and vacancies of host material. The other feature of sharp peaks is very similar and belongs to Dy³⁺ ions. The f–f transitions in the range of 417–475 nm correspond to the transitions from 6H_{15/2} to 4K_{17/2} + 4M_{19/2,21/2} + 4I_{13/2} + 4F_{7/2}, 4G_{11/2}, 4I_{15/2} and 4F_{9/2}, in the range of 392 nm to 6P_{3/2} + 6P_{5/2}, and in the range of 312–370 nm to 4K_{15/2}, 6P_{7/2} + 4M_{15/2} and 4I_{11/2}, respectively. The peaks at 482, 465, and 455 nm could be assigned to the transition of 4F_{9/2} ? 6H_{15/2}, 4I_{15/2} ? 6H_{15/2} and 4G_{11/2} ? 6H_{15/2} of Dy³⁺, respectively. Dy³⁺ has emissions due to the atomic energy levels of itself and emissions due to the acceptor levels of defect sites formed by Dy³⁺.