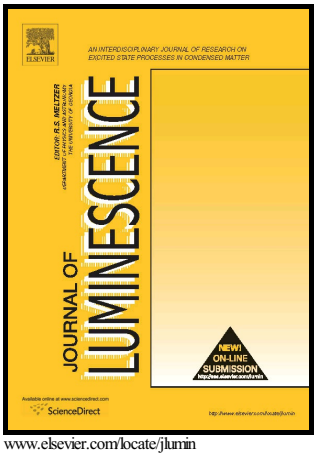

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Abstract: For the first time, X-ray excited luminescence of $Sr_2MgSi_2O_7:Eu^{2+}$, Dy^{3+}, an efficient persistent phosphor with good potential for lighting, biological imaging and photodynamic activation, is reported in this paper. A modified Sol-Gel method is used to synthesize $Sr_2MgSi_2O_7:Eu^{2+}$, Dy^{3+} phosphors and their luminescence properties are highly associated with the synthesis conditions. The dependences of the X-ray excited optical luminescence and persistent luminescence of $Sr_2MgSi_2O_7:Eu^{2+}$, Dy^{3+} on the reaction pH, temperature, ratio of Eu/Dy, and the calcination duration time are investigated and the association of the luminescence behaviors with the synthesis conditions is explored as a good strategy to optimize the phosphors for practical applications.

Keywords

Afterglow nanoparticle, X-ray excited luminescence, silicate, persistent luminescence

1. Introduction

Persistent luminescent or afterglow materials have become a topical area as they have many applications such as emergency lighting, imaging, security and photodynamic activation for cancer treatment [1-10].