

Red light emitting persistent luminescence in Pr³⁺-doped silicate

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The phosphors with persistent luminescence in others colors than blue-green are still rare. For some specific applications, not only the length and intensity but also the spectral range of persistent luminescence is of importance. Thus new materials with red persistent luminescence are considered necessary. Actually rare-earth ions have been measured the most important optical activators for luminescent devices. Among these devices, the Pr³⁺-doped oxide materials give rise to intense luminescent bands in the blue-green (³P₀ → ³H₄) and red (¹D₂ → ³H₄) regions, whose relative intensities can be regulated by modification of the factors like the excitation wavelength, the host composition and doping concentration.

The praseodymium ion doped cadmium and zinc silicate phosphors were prepared by solid state reaction. The Pr³⁺ dopant level ranges from 0,5% to 5%. After having taken the raw materials in stoichiometric and homogenized where all the grinding was done with agate pestle and mortar. The photoluminescence properties of these materials were studied.

An important result of the present work is that we observed intense red-emitting long afterglow in Pr³⁺-doped silicates, Figure 1. The emission band can be attributed to ¹D₂ → ³H₄ intraconfigurational transition of Pr³⁺ ion. The morphology of microstructure was observed by Scanning electronic micrEM, Figure 2.

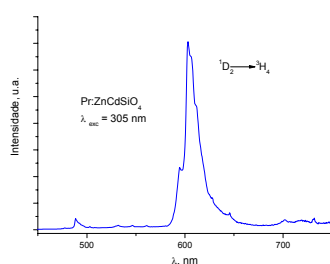


Figure 1. Emission spectrum

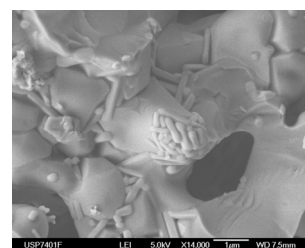


Figure 2. SEM image

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