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**Efficient sensitization of Sm²⁺ emission by Eu²⁺ under UV excitation in Al₂O₃ host
formed by plasma electrolytic oxidation**

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Abstract

Al₂O₃ coatings doped with Sm²⁺ and Eu²⁺ ions are synthesized using plasma electrolytic oxidation (PEO) process. Photoluminescence (PL) spectra of formed coatings excited by 260 nm are composed of broad PL bands associated with Eu²⁺ ions in Al₂O₃ host with a maximum at around 405 nm and sharp bands in red region corresponding to ⁵D₀→⁷F_J (J = 0,1,2) transitions of Sm²⁺ ions. Comparison of the emission PL spectra of Sm²⁺, Eu²⁺ and Sm²⁺/Eu²⁺ doped Al₂O₃ shows that the emission PL intensity of Sm²⁺ ions in Al₂O₃ host is about one order of magnitude lower than that of Sm²⁺/Eu²⁺ doped Al₂O₃ indicating that Eu²⁺ is a very efficient sensitizer for Sm²⁺ PL enhancement. It is also evident that an addition of Sm²⁺ to Eu²⁺ doped Al₂O₃ coatings causes a decrease of the Eu²⁺ emission, indicating that non-radiative energy transfer takes place from Eu²⁺ ions to Sm²⁺ ions.

Keywords: Photoluminescence, Plasma electrolytic oxidation; Sm²⁺; Eu²⁺; Energy transfer.

1. Introduction

It is well known that divalent europium ions (Eu²⁺) have been widely used as activators in host materials, which after activation show strong broad excitation and emission

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