OPTIMIZATION OF Tm⁺ CONCENTRATION IN Al₂O₃ THIN FILMS FOR BROADBAND LIGHT EMISSION

Zhisong Xiao 1, 2, Bo Zhou 1;
1 Department of Physics, School of Science, Beihang University, Beijing 100083, China;

R. Serna, C.N. Afonso
2 Instituto de Optica, CSIC, Serrano 121, 28006 Madrid, Spain.

Two series of Tm-doped amorphous aluminum oxide (Al₂O₃) has been synthesized by PLD. Two broad emission bands peaked at 1480 nm and 1640 nm originated from the transition of Tm⁺: 3H₄ - 3F₄ and 3F₄ - 3H₆ are observed. The dependence of the photoluminescence properties, intensity and lifetime, on the Tm concentration and distribution has been studied with a wide range of Tm concentrations in the films. It is shown that concentration quenching and cross-relaxation impose different effects on luminescence performance according to the Tm concentration and on the deposition conditions.