

Structural and Luminescence Properties of Eu-Doped PMO Films with Ethylene Bridge and Methyl Terminal Groups

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Estimations of atomic concentration of Eu (at% of Eu):

In this work, the ratio of 1,2-bis(trimethoxysilyl)ethane (BTMSE, 96%, Sigma-Aldrich) and methyltrimethoxysilane (MTMS, 98%, Fluka) was 47/53. The amount of BTMSE was 1.07 gm and MTMS was 0.60158 gm.

The amount of 25.8 wt% $\text{Eu}(\text{NO}_3)_3 \cdot 6\text{H}_2\text{O}$ in solution:

$$= (\text{Quantity of BTMSE} + \text{Quantity of MTMS}) \times 25.8\%$$

$$= (1.07 \text{ g} + 0.60158 \text{ g}) \times 0.258$$

$$= 0.431267 \text{ g}$$

$$= 0.431267 \text{ g} \times 99.99\% (\text{purity})$$

$$= 0.43122 \text{ g of } \text{Eu}(\text{NO}_3)_3 \cdot 6\text{H}_2\text{O}$$

Then the atomic percent of Eu (at% of Eu),

$$= \frac{\text{atomic mass of Eu} \times \text{amount of 25.8 wt\% } \text{Eu}(\text{NO}_3)_3 \cdot 6\text{H}_2\text{O} \times 100}{\text{Atomic mass of 25.8 wt\% } \text{Eu}(\text{NO}_3)_3}$$

$$= \frac{151.964 \times 0.43122 \times 100}{446.07} = 14.69 \text{ at\% of Eu}$$

Similarly,

The atomic percent at% of Eu for 1.7 wt% $\text{Eu}(\text{NO}_3)_3 \cdot 6\text{H}_2\text{O}$ = 0.97 at% of Eu

The atomic percent at% of Eu for 12.1 wt% $\text{Eu}(\text{NO}_3)_3 \cdot 6\text{H}_2\text{O}$ = 6.89 at% of Eu