

Supporting information to Luminescence enhancement of self-assembled $\text{Y}_2\text{O}_3\text{:Eu}^{3+}$ thin film-coated porous alumina membrane

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1. Procedure to estimate the structural parameters of $\text{Y}_2\text{O}_3\text{:Eu}^{3+}$ films deposited on PAMs

The SEM images were analyzed using ImageJ software to determine the average pore diameter (d), the average interpore distance (p) and the porosity (P) of $\text{Y}_2\text{O}_3\text{:Eu}^{3+}$ films deposited on PAMs. From the SEM image (figure SI.1a), the intensity distribution is plotted as a function of the distance allowing us to determine the interpore distance (figure SI-1b). The pore diameter distribution (figure SI-1c) as well as the porosity was determined after image flattening and cleaning using filters and various tools available in ImageJ.

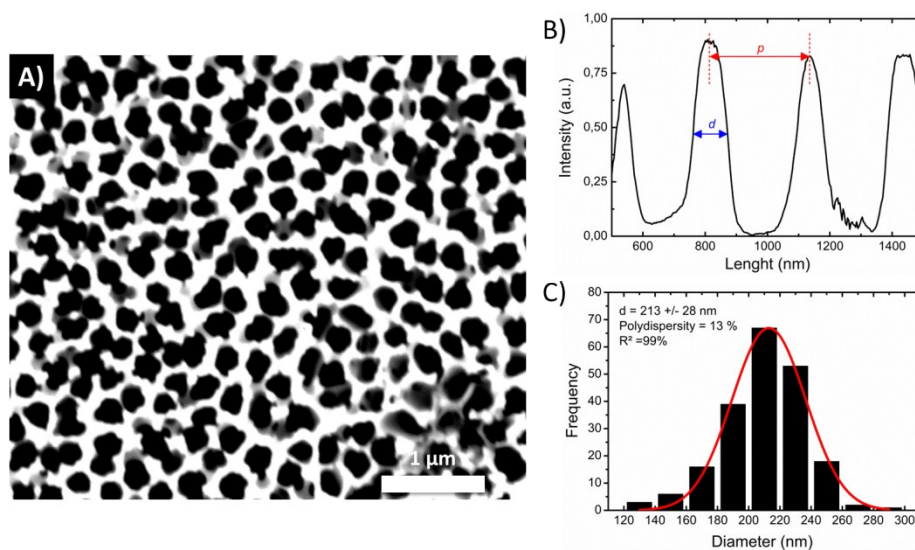


Figure SI-1 - SEM image of a 60-nm thick $\text{Y}_2\text{O}_3\text{:Eu}^{3+}$ film deposited on PAM₂₀₀ and analyzed using ImageJ software.

2. X-ray diffraction measurements

X-ray characterizations were performed using a Rigaku SmartLab diffractometer with a $\text{CuK}_{\alpha 1}$ radiation ($\lambda = 1.5406 \text{ \AA}$) in the θ - 2θ Bragg-Brentano configuration. Diffractograms were carried out with a 0.01° step size and a scan speed of $1^\circ/\text{min}$. According to the diffractograms shown below, both deposited films appear amorphous, as no diffraction lines are detected.

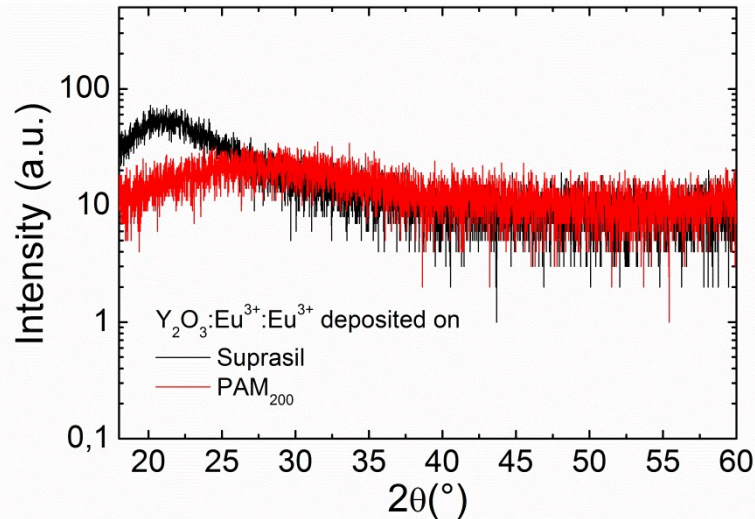


Figure SI-2 - X-ray diffractograms of annealed $\text{Y}_2\text{O}_3:\text{Eu}^{3+}$ thin film (60 nm-thick) deposited on Suprasil and PAM_{200} .

3. Effect of the structure orientation (incident angle as well as conical angle) on the emission spectra of $\text{Y}_2\text{O}_3:\text{Eu}^{3+}$ deposited on PAM_{200} .

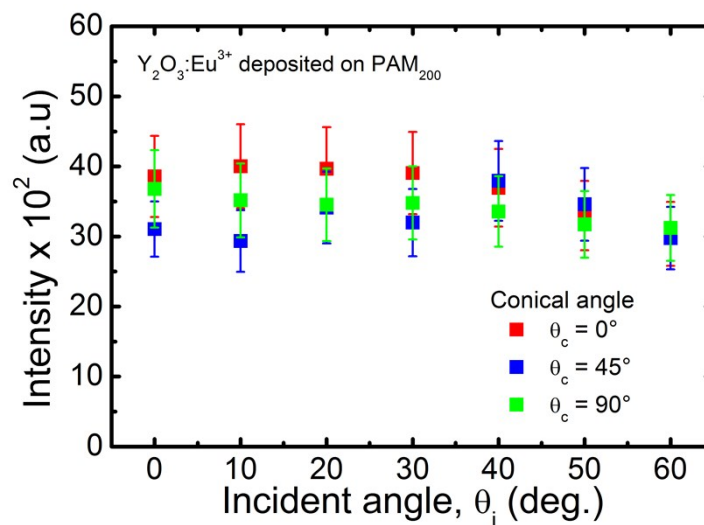


Figure SI-3 - Emission intensity as a function of the incident angle (θ_i) as well as the conical angle (θ_c) for $\text{Y}_2\text{O}_3:\text{Eu}^{3+}$ deposited on PAM_{200} . The measurements were performed in an integrating sphere.

4. Emission spectra of the porous alumina membrane PAM₂₀₀.

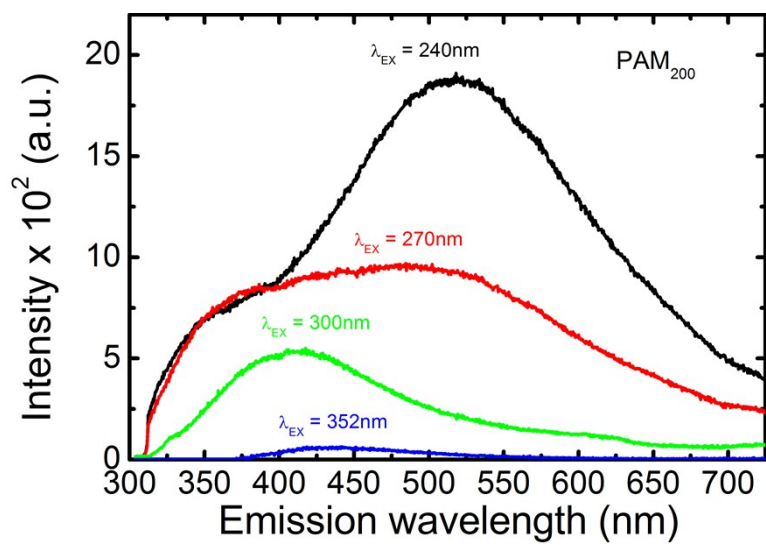


Figure SI-4 - Emission spectra of PAM₂₀₀ under various excitation wavelengths.