ENHANCEMENT OF 1.54 μm EMISSION IN Er3+-Si NPs CODOPED Al2O3 FILMS: ROLE OF DOPANT DISTRIBUTION AND SIZE CONTROL IN THE NANOSCALE

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The enhancement of the 1.54 μm emission of Er3+ ions by sensitization with amorphous silicon nanoparticles (NPs) in a-Al2O3 as a function of the Si NP size and the separation between Er3+ and Si NPs is studied. An excellent control of the film nanostructure is achieved by independent pulsed laser ablation from Er, Si and Al2O3 targets in vacuum. The Si-NPs are formed by nucleation at the substrate with sizes in the 5-10 nm range. It will be shown how a photoluminescence intensity increase of a factor from 5 up to 150 can be achieved for the codoped films compared to the Er-only doped films.