

# THE INFLUENCE OF SILVER NANOPARTICLES ON THE f-f LUMINESCENCE OF THE EuEDTA COMPLEX IN THE POLYVINYLPYRROLIDONE POLYMER: MODELLING ABNORMAL LUMINESCENCE ENHANCEMENT FACTORS

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## ABSTRACT

The theoretical model developed in Ref.[1] has been applied to the analysis of experimental results previously obtained by Reisfeld et al [2] on the influence of silver nanoparticles in a polyvinylpyrrolidone (PVP) polymer film containing a trivalent europium complex with EDTA ligand. Depending on the excitation source (at 393 nm with a xenon lamp or at 532 nm with a focused diode laser) the characteristic Eu<sup>3+</sup> luminescence is observed to be enhanced by factors between 5 and 50, this later factor being quite unusual. The theoretical analysis presumes a migration process of the EuEDTA complex units towards the silver nanoparticles and subsequently the treatment of the competition between local high field gradient effects and Eu<sup>3+</sup> ion to the silver nanoparticles energy transfer successfully accounts for the observed luminescence enhancement factors.

[1] O.L.Malta and M.A.Couto dos Santos, Chem. Phys. Letters 174, 13 (1990).

[2] R.Reisfeld, T.Saraidarov, G.Panzer, V.Levchenko and M.Gaft, Opt. Mat.34, 351 (2011).

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