## Structure and Emission Properties of Erbium Quinolinolate Complexes

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We have recently reported the first combined optical and structural investigation of the water free Er-quinolinolate complex [1], a prototype organo-lanthanide system for 1.5-µm telecom applications. The complex has a trinuclear structure  $(Er_3Q_9)$  which provides the Er metals with an octa-coordination by the organic ligand and prevents solvent and water molecules from entering the lanthanide coordination sphere. By using the 5,7-dichloro-8-hydroxyquinoline (ClQH) the new [ErCl(ClQ)<sub>2</sub>(ClQH)<sub>2</sub>] compound has been obtained. The Er intrinsic deactivation occurs in this case with a time constant which is approximately twice the value obtained for Er<sub>3</sub>Q<sub>9</sub> (4.0 vs 2.2 us) but still three orders of magnitude faster than the erbium radiative lifetime. Structural data have been used to calculate the transfer time from the Er ions to the C-H groups of the ligand in the framework of the Förster's theory and the obtained decay times are in agreement with those experimentally found. Thus the C-H groups sitting in the Er inner coordination sphere represent a very severe limit to the IR emission yield of organo-Er complexes. Ligands which do not bear CH or OH groups appear to be promising to prepare complexes with enhanced emission efficiency.

[1] Artizzu F., et al., Inorg. Chem, 2005, 44, 840-842.

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