**A new colored lanthanum complex and La2O3 nanoparticles, base on methyl orange dye**

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**Abstract**

A new Lanthanum methyl orange complex ([La(L)3(DMF)3(H2O)3] L = methyl orange) were synthesized by the reaction of methyl orange and lanthanum(III) nitrate hexahydrate in the aqueous solution. Then Lanthanum oxide nanoparticles were synthesized by varies methods such as calcination and hydrothermal methods from the new lanthanum complex precursor. The products were characterized by luminescence spectroscopy, FT-IR spectroscopy, UV-Vis spectroscopy, single-crystal X-ray structure analysis, X-ray diffraction (XRD), elemental analysis and FE-SEM.

**Keywords:** methyl orange, Lanthanum complex, azo dye, nanoparticle

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