Thermal behavior and decomposition mechanism of a series of crown ether based lanthanide(III) hexacyanometallate(III) compounds

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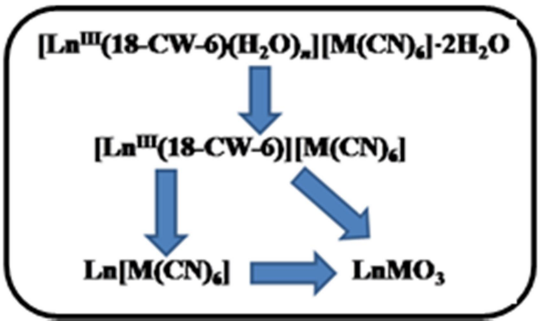

Abstract: Thermal decomposition reactions of eight lanthanide(III) compounds (Ln = Ce, Nd, Sm, Eu, Gd and Tb) having l8-crown-6 and water molecules in the inner sphere and hexacyanoferrate(III)/hexacyanochromate(III)/hexacyanocobaltate(III) in the secondary sphere have been performed by means of TG-DTA in an atmosphere of dry nitrogen. The results show that the dissociation processes consist of several steps. The compositions of the products and the dissociation mechanisms have been understood from relative weight loss as well as from elemental analyses and FT-IR spectral data. It has been found that the relative stability with respect to the decomposition of the crown ether moiety depends on the atomic number of lanthanides or the nature of the 3d metal ion in the hexacyanometallate(III).

Keywords: Lanthanide(III), l8-crown-6, hexacyanometallate, TG-DTA, dissociation mechanism.