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NEW HETEROPOLYNUCLEAR Bi-Sm AND Bi-Ho COMPLEXES WITH ETHYLENEDIAMINETETRAACETIC ACID

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The search for bismuth-lanthanide coordination compounds that could be used as molecular precursors for Bi-Ln-based oxide-type materials displays a wide interest in the relationship with the numerous applications of such inorganic materials as ion conductors (Bi-La, Nd, Sm), ferroelectrics (Bi-Sm, La) or inorganic pigments (Bi-Ho) [1]. When compared with the traditional ceramic route involving oxides of the component metals, these precursor methods actually provide materials displaying a higher homogenity and specific surface area.

As an ongoing effort to synthesise new potential precursors for inorganic materials, we have obtained two new heterometallic coordination compounds with ethylenediamine tetraacetate ion as a ligand with the following general formulae: $LnBiEdta(NCS)_2 \cdot 4H_2O$ (Ln = Sm, Ho). The composition has been confirmed by elemental analysis, TG/TGA study, IR spectroscopy and single crystal X-ray diffraction. The results of X-ray study revealed that the compounds are isomorphous, crystallizing in $P2_1/n$ space group with the average cell parameters: a = 9.3, b =16.7, c = 14.5 (Å), β=103º.

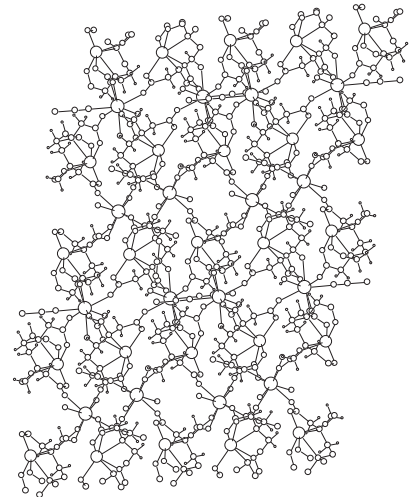


Fig. 1. Packing of $LnBiEdta(NCS)_2 \cdot 4H_2O$

The crystal structure represents a 3D coordination network (see fig.) sustained by the four bridging carboxylate groups of the $Edta^{4-}$ ligand and one of the two NCS^- ligands coordinated to Bi through S atom and to Ln through N atom. The second NCS^- group is coordinated to Bi ion as a monodentate ligand. Analogous tridimensional structures have been obtained with nitrate ion [2].

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