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Programme and Abstracts

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Ln-CONTAINING HETEROPOLY TUNGSTATES WITH PEACOCK-WEAKLEY ANION: SYNTHESIS AND CRYSTAL STRUCTURE OF ISOSTRUCTURAL SALTS $\text{Na}_9[\text{Ln}(\text{W}_5\text{O}_{18})_2] \cdot 35\text{H}_2\text{O}$ (Ln=Gd, Er)

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The conditions for the synthesis of a new isostructural heteropoly tungstates $\text{Na}_9[\text{Ln}(\text{W}_5\text{O}_{18})_2] \cdot 35\text{H}_2\text{O}$ (Ln = Gd, Er) from the aqueous solution, acidified to $Z=v(\text{H}^+)/v(\text{WO}_4^{2-})=0.80$, were determined. Single Crystal X-ray Diffraction Analysis, and FTIR spectroscopy were used to show that the anion within the synthesized salts has a Peacock-Weakley structure.

Nature of stretch and deformation vibrations in the tungsten-oxygen framework within FTIR spectra of air-dry samples of salts indicates to the presence of Peacock-Weakley heteropoly anion of 10th row in them [1]. In this anion, two lacunar tetradentate pentatungstate-anions $\text{W}_5\text{O}_{18}^{6-}$ are coordinated to Ln-heteroatom, thus forming a coordination polyhedron in the shape of a square antiprism.

Fig. 1 depicts the atomic numbering scheme and the structure of the main building block in $\text{Na}_9[\text{Ln}(\text{W}_5\text{O}_{18})_2] \cdot 35\text{H}_2\text{O}$ (Ln = Gd, Er). The W—O bond lengths in WO_6 octahedra are in a range of 1.610–2.371 Å, bond angles are significantly distorted. The variety of Ln—O bond lengths in LnO_8 square antiprism is much smaller (2.334–2.420 Å). In general, geometry of the anion has close agreement with the literature data [2]. Despite the fact that the structures of $\text{Na}_9[\text{Ln}(\text{W}_5\text{O}_{18})_2] \cdot 35\text{H}_2\text{O}$ (Ln = Gd, Er) are similar to the reported structure of $\text{Na}_8\text{H}[\text{Gd}(\text{W}_5\text{O}_{18})_2] \cdot 30\text{H}_2\text{O}$ [2], the structure of the cation sublattice considerably differs from the data in [2].

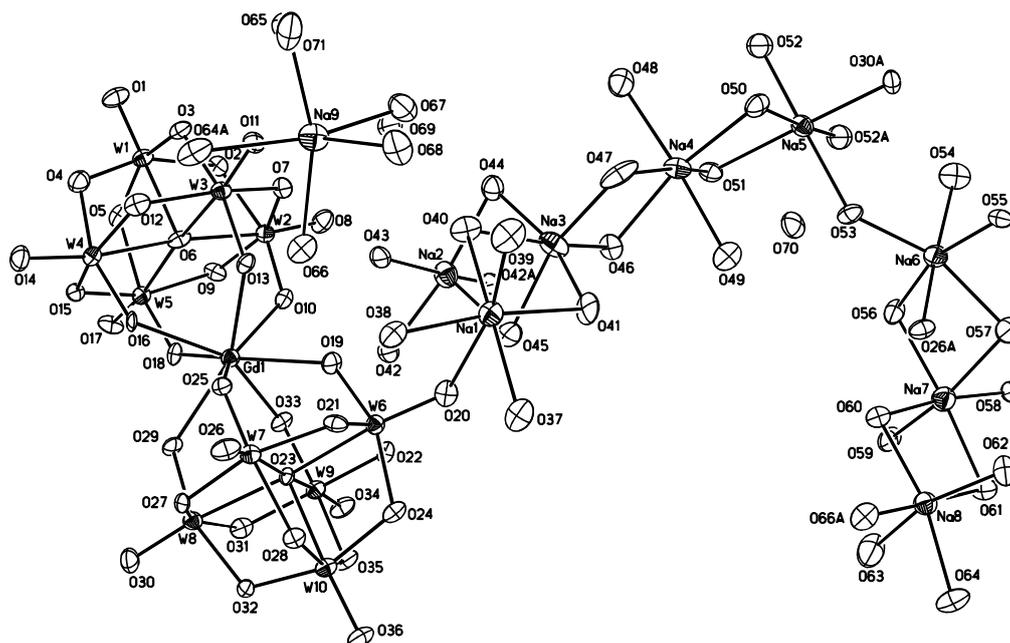


Fig. 1. Structure of the main building block and thermal ellipsoids (50 % probability level) in $\text{Na}_9[\text{Ln}(\text{W}_5\text{O}_{18})_2] \cdot 35\text{H}_2\text{O}$ (Ln = Gd, Er) and the scheme of atomic numbering in the structure. The equivalent atoms used to complete the polyhedra, are denoted by the letters A.

It worth mentioning that this is the second case when the synthesis of isostructural heteropoly compounds with Peacock-Weakley anion is described in the literature.

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[2] T. Yamase, T. Ozeki, M. Tosaka, Octasodium hydrogen decatungstogadolinate triacontahydrate. *Acta Cryst.* **C50**, 1849–1852 (1994).