

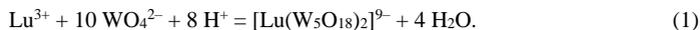
NEW Lu(III)-CONTAINING HETEROPOLY SALT WITH PEACOCK–WEAKLEY TYPE ANION $\text{Na}_9[\text{Lu}(\text{W}_5\text{O}_{18})_2] \cdot 42\text{H}_2\text{O}$: SYNTHESIS AND CRYSTAL STRUCTURE

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New neutral sodium salt with Peacock-Weakley type anion $\text{Na}_9[\text{Lu}(\text{W}_5\text{O}_{18})_2] \cdot 42\text{H}_2\text{O}$ and Lu(III) as heteroatom was synthesized using procedure, elaborated in (Mariichak O. Yu., *et al.* Patent of Ukraine No. 121322, 2017). The crystalline compound was obtained from the aqueous solution acidified up to $Z=0.80$ ($Z=v(\text{H}^+)/v(\text{WO}_4^{2-})$) from $\text{Lu}(\text{NO}_3)_3\text{--Na}_2\text{WO}_4\text{--HNO}_3\text{--H}_2\text{O}$ system. The formation of the salt is going according to the reaction (1):



The synthesized salt was characterized by single-crystal X-ray diffraction (fig. 1), elemental analysis, FT-IR spectroscopy, and scanning electron microscopy.

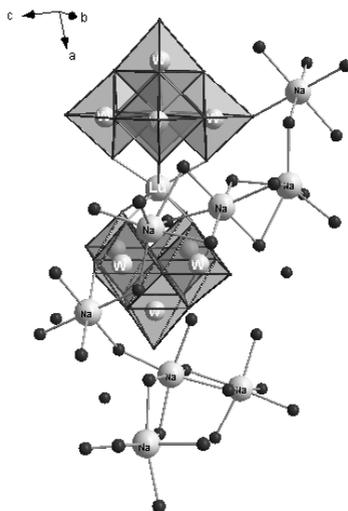


Fig. 1. Crystal structure of $\text{Na}_9[\text{Lu}(\text{W}_5\text{O}_{18})_2] \cdot 42\text{H}_2\text{O}$

The $\text{Na}_9[\text{Lu}(\text{W}_5\text{O}_{18})_2] \cdot 42\text{H}_2\text{O}$ consists of decatungstolanthanidate(III) anion, nine octahedrally coordinated Na^+ cations, and 42 H_2O molecules. The anion of $[\text{Lu}(\text{W}_5\text{O}_{18})_2]^{9-}$ is comprised of two $[\text{W}_5\text{O}_{18}]^{6-}$ lacunary units, which coordinate to a central Lu^{3+} cation in the form of square antiprism. The main crystallographic data for $\text{Na}_9[\text{Lu}(\text{W}_5\text{O}_{18})_2] \cdot 42\text{H}_2\text{O}$ are: monoclinic, $C2/c$, $a = 16.225(5) \text{ \AA}$, $b = 19.939(5) \text{ \AA}$, $c = 22.329(6) \text{ \AA}$, $\alpha = \gamma = 90^\circ$, $\beta = 99.89(3)^\circ$, $V = 7116(3) \text{ \AA}^3$, $Z = 4$. Microscopic analysis showed that the surface of grains of Lu(III)-containing salt has fuzzy blurred edges. Uniform surface contrast in BEC mode and characteristic X-ray emission clearly indicates the formation of single-phase sample.

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