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Taras Shevchenko National University of Kyiv

TARAS SHEVCHENKO NATIONAL UNIVERSITY OF KYIV

KYIV-TOULOUSE

IXth INTERNATIONAL CHEMISTRY CONFERENCE "KYIV-TOULOUSE" DEDICATED TO THE 100TH ANNIVERSARY OF FEDIR BABICHEV

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La-CONTAINING HETEROPOLY TUNGSTATE WITH PEACOCK–WEAKLEY ANION: SYNTHESIS OF $Na_9[La(W_5O_{18})_2]\cdot nH_2O$ FROM AQUEOUS AND AQUEOUS-ORGANIC MEDIA

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The conditions for the synthesis of new heteropoly tungstates $Na_9[La(W_5O_{18})_2]\cdot nH_2O$ from the aqueous and H_2O-Solvent media (Solvent = acetone, CH_3CN, C_2H_5OH), acidified to $Z=\nu(H^+)/\nu(WO_4^{2-})=0.80$, were determined.

Acidity $Z=\nu(H^+)/\nu(WO_4^{2-})=0.80$ in the presence of stoichiometric amounts of initial reagents corresponds to the formation of heteropoly anions:

$Ln^{3+} + 10WO_4^{2-} + 8H^+ \leftrightarrows [Ln(W_5O_{18})_2]^{9-} + 4H_2O$ (Ln – lanthanoid).

To isolate such particles with La^{3+}–heteroatoms, sodium tungstate solutions (C_W=0.1 mol/L) acidified to Z=0.80 were used, to which $La(NO_3)_3$ solutions were added with vigorous stirring. After decanting of the components in a stoichiometric ratio of La:W=1:10, solvents were added to the systems (up to 50 vol. %) and formation of needle-like crystalline precipitates were observed.

FTIR spectroscopy was 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. In this anion, two lacunar tetradentate pentatungstate-anions $W_5O_{18}^{6-}$ are coordinated to La-heteroatom, thus forming a coordination polyhedron in the shape of a square antiprism.

Using Scanning Electron Microscopy the surface morphology of heteropoly compounds was studied, and it was found out that the grain size is within the range of 140-300 nm (for the sample salted by acetone), 200-400 nm (for the sample salted by CH_3CN), 300-450 nm (for the sample salted by ethanol). Single-phase condition of the synthesized salts was confirmed by the surface uniform contrast in backscattered electron mode. On the micrographs of salts powder in characteristic X-ray emission there are no regions with different surface morphology, and there is an even distribution of La, Na, W, O, without segregation and cliquation. These clearly indicate to the formation of a single-phase sample.

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