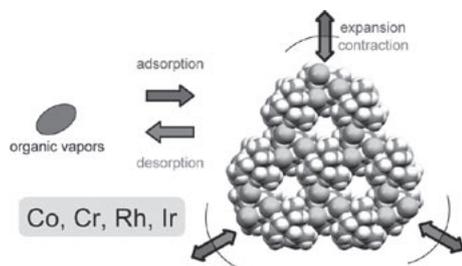


and organic vapors accompanying the expansion of channel in its crystal structure.[1] To investigate the possibility of single crystal of tris-ethylenediamine metal complexes as ionic single-crystal hosts for vapor adsorption, a series of adsorbency of single crystals of  $[M^{III}(en)_3]Cl_3$  ( $M = Co, Cr, Rh, Ir$ ) were studied. All complexes have channels in their crystal structures, which dynamically and reversibly change their size with vapor adsorption, and show similar vapor adsorbency like the adsorption behavior of  $[Co(en)_3]Cl_3$ . [2]

[1] S. Takamizawa, T. Akatsuka, T. Ueda, *Angew. Chem. Int. Ed.*, 47(9), 1689-1692 (2008).

[2] S. Takamizawa, M. Kohbara, T. Akatsuka, R. Miyake, submitted



Keywords: gas-solid inclusion reaction, solid-state structural changes, ionic crystals

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### Synthesis and properties of dioxalato cuprates (II) and ruthenium (III) aminocomplexes salts

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Double complex salts (DCS) are of great interest as precursors of bimetallic solid solutions and intermetallics. Solid solutions based on platinum group metals have high catalytic activity. Thermolysis such single-source molecular precursors under low temperature (400 °C) allows to prepare bimetallic powders with definite ratio of components and particles size about 5-10 nm. This work related to synthesis of complexes contained simultaneously ruthenium and copper and study of their metallic thermolysis products. In the field of this work the following DCS were synthesized:  $[Ru(NH_3)_5Cl][Cu(C_2O_4)_2] \cdot H_2O$  (I),  $[RuNO(NH_3)_4OH][Cu(C_2O_4)_2] \cdot 1.5H_2O$  (II). Obtained DCS were characterized by IR-spectroscopy, elemental analysis, XRD and X-ray single crystal analysis. This is crystallographic data: (I)  $a = 7.6277(5)$ ,  $b = 13.1052(8)$ ,  $c = 14.9640(7)$  Å,  $b = 97.852(2)$ ,  $V = 1481.81(15)$  Å<sup>3</sup>,  $P2_1/n$ ,  $Z = 4$ ,  $D_x = 2.148$  g/cm<sup>3</sup>; (II)  $a = 7.1121(2)$ ,  $b = 10.3941(3)$ ,  $c = 10.6288(3)$  Å,  $\alpha = 97.0340(10)$ ,  $\beta = 107.6150(10)$ ,  $\gamma = 92.8600(10)$ ,  $V = 740.10(4)$  Å<sup>3</sup>,  $P-1$ ,  $Z = 1$ ,  $D_x = 2.276$  g/cm<sup>3</sup>. Structures are build of discrete  $[Ru(NH_3)_5Cl]^{2+}$ ,  $[RuNO(NH_3)_4OH]^{2+}$ ,  $[RuNO(NH_3)_5]^{2+}$  cations and  $[Cu(C_2O_4)_2]^{2-}$  anions. Thermolysis of obtained salts under inert and reduction atmosphere was studied. The XRD investigation of thermolysis products was carried out. Decomposition of salts under helium atmosphere begin at 140 - 150°C, occur in 2 stages and finish at 520°C (I), at 300°C (II). Thermolysis products are Ru, RuO<sub>2</sub>, CuCl, Cu<sub>2</sub>O. Decomposition of complexes under hydrogen atmosphere also studied. Product is Ru<sub>0.8</sub>Cu<sub>0.2</sub>. This work was supported by the RFBR grants 07-03-01038-a, 08-03-00603-a.

Keywords: double complex salt, ruthenium, copper

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### Synthesis and crystallographic study in the PbO-Bi<sub>2</sub>O<sub>3</sub>-V<sub>2</sub>O<sub>5</sub> System: Pb<sub>3-x</sub>Bi<sub>2/3x</sub>V<sub>2</sub>O<sub>8</sub>

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PbO-Bi<sub>2</sub>O<sub>3</sub>-V<sub>2</sub>O<sub>5</sub> System is of current interest owing to its use to generate novel ion conducting materials [1]. Pb<sub>3</sub>V<sub>2</sub>O<sub>8</sub> displays two structural phase transitions at 373 and 273 K [2]. The first order phase transitions have been studied both by neutron and X-ray powder diffraction [3]. The high temperature  $\gamma$  phase of Pb<sub>3</sub>V<sub>2</sub>O<sub>8</sub> adopts the palmerite structure [4, 5]. In this context, polycrystalline samples in the series Pb<sub>3-x</sub>Bi<sub>2/3x</sub>V<sub>2</sub>O<sub>8</sub> ( $x = 0.2$  to 1.5) have been synthesized by solid-state route. The compositions  $x = 0.2$  to 0.7 form a solid solution with a structure similar to  $\gamma$  form of Pb<sub>3</sub>V<sub>2</sub>O<sub>8</sub>, as confirmed by powder diffraction studies while Pb<sub>3</sub>BiV<sub>3</sub>O<sub>12</sub> ( $x = 1.0$ ) was isolated from a mixture of two phases. Single crystals of both phases representing two new vanadates were grown by melt-cool technique. Pb<sub>2.5</sub>Bi<sub>1/3</sub>V<sub>2</sub>O<sub>8</sub> ( $x = 0.5$ ) and Pb<sub>3</sub>BiV<sub>3</sub>O<sub>12</sub> ( $x = 1.0$ ), have been analysed by single-crystal X-ray diffraction. Pb<sub>2.5</sub>Bi<sub>1/3</sub>V<sub>2</sub>O<sub>8</sub> crystallizes in a trigonal system, space group  $R-3m$ , with  $a = 5.755(6)$  Å,  $c = 20.317(4)$  Å,  $V = 582.74(1)$  Å<sup>3</sup> and  $Z = 3$  whereas Pb<sub>3</sub>BiV<sub>3</sub>O<sub>12</sub> is cubic (eulytite), space group  $I-43d$ , with  $a = 10.749(2)$  Å,  $V = 1241.9(1)$  Å<sup>3</sup> and  $Z = 4$ . It is of interest to note that this study for the first time describes the structural motifs formed by a eulytite vanadate.

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Keywords: synthesis, solid solution, powder and single crystal diffraction

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### Photoinduced surface relief grating formation using single crystals of azobenzene derivatives

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Surface relief grating (SRG) formation by irradiation of amorphous films of azobenzene-containing polymers with two coherent laser beams has recently received a great deal of attention in view of both academic interest and potential technological applications. We have been performing studies of the photoinduced SRG formation using azobenzene-based photochromic amorphous molecular materials. Photoinduced SRG formation is believed to take place by mass transport induced by *trans*-*cis* and *cis*-*trans* isomerizations of azobenzene chromophore. Several models for the mechanism of the SRG formation have been proposed; however, the details have not been clear yet. In contrast to amorphous materials, it is of interest to