

## Poster Presentation

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### *Growth and structure of $K_2Co_xNi_{(1-x)}(SO_4)_2 \cdot 6H_2O$ mixed single crystals*

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To date, crystals of Tutton salts with the general formula  $(M^+)_2M^{2+}(SO_4)_2 \cdot 6H_2O$  (where  $M^+$  - alkali metal or ammonium,  $M^{2+}$  - bivalent metal -  $Co^{2+}$ ,  $Ni^{2+}$ ) are used as a materials for ultraviolet (UV) filters. Only in recent year effort of ternary crystal growth has been taken. The main problem of mixed crystal growth from liquid solution is high level of the crystal inhomogeneity, which leads to generation of the elastic stress, inclusion trapping and micro- and macrocrack formation in the bulk crystal. For the first time the optically homogeneous mixed  $K_2Co_xNi_{(1-x)}(SO_4)_2 \cdot 6H_2O$  (KCNSH) large single crystals have been grown from solutions of different compositions by the temperature-reduction technique. Precise X-ray experiment of three mixed crystals was carried out by four-circle diffractometer CAD-4F and XcaliburS diffractometer with two-dimensional CCD detector at the room temperature. KCNSH crystals belong to the monoclinic space group  $P2(1)/c$ . Each  $Co^{2+}$  or  $Ni^{2+}$  ion is coordinated with six  $H_2O$  molecules, forming a distorted octahedral  $(Co(H_2O)_6)^{2+}$  and  $(Ni(H_2O)_6)^{2+}$  unit. With increasing content of nickel ions in the crystal, the octahedral unit is narrowed and the unit cell volume is decreased. Chemical formulas refined using diffraction data are  $K_2Co_{0.657}Ni_{0.343}(SO_4)_2 \cdot 6H_2O$ ,  $K_2Co_{0.226}Ni_{0.774}(SO_4)_2 \cdot 6H_2O$  and  $K_2Co_{0.216}Ni_{0.784}(SO_4)_2 \cdot 6H_2O$ . Ratios of isomorphous cobalt and nickel components in the mixed crystals are conformed to data obtained by atomic emission spectroscopy. Effect of the  $Co^{2+}$  and  $Ni^{2+}$  ion ratio in KCNSH single crystal to crystal quality is considered.

**Keywords:** mixed crystal, crystal growth, structure