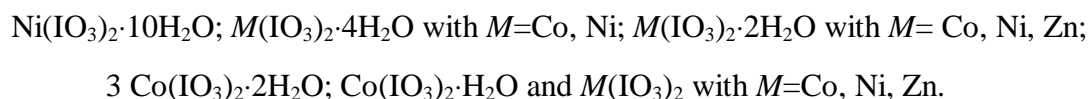


Abstract

The aim of this doctoral thesis, which was made in the inorganic solid state chemistry, was the preparation and characterization by x-ray diffraction and vibrational spectroscopy of some hydrate iodates of cobalt, nickel and zinc with following compositions:



The structures of three novel hydrate iodates with the compositions $\text{Ni}(\text{IO}_3)_2 \cdot 10\text{H}_2\text{O}$, $\text{Co}(\text{IO}_3)_2 \cdot \text{H}_2\text{O}$ and $2\text{Co}(\text{IO}_3)_2 \cdot 3\text{H}_2\text{O}$ was examined. In addition the structure of $\text{Zn}(\text{IO}_3)_2 \cdot 2\text{H}_2\text{O}$ was solved by using single crystal data and the refinement of the structure of $\text{Co}(\text{IO}_3)_2 \cdot \text{H}_2\text{O}$ and $\beta\text{-Ni}(\text{IO}_3)_2$ by using powder data was presented.

The structural relationship of some transition metal iodates were intensively discussed. For most of them the distances of the intra- and intermolecular hydrogen bonds were calculated. The results showed the exceptionally strong hydrogen bonds in $\text{Co}(\text{IO}_3)_2 \cdot \text{H}_2\text{O}$.

The influence of the solid state is discussed on vibrational spectra of halogenates with undisturbed C_{3v} symmetry.

Furthermore experiments with a diffusive infrared-reflection unity (DRIFT) were presented. The DRIFT spectroscopy is an interesting alternative for vibrational spectroscopic measurements. The advantages of these technique compared with common transmission infrared spectroscopy were explained. As a result of the experiments some new embedding materials were introduced.

Keywords:

Iodates, Hydrates, Hydrogen bonds; vibrational spectroscopy; Raman spectra; Infrared spectra; Diffuse reflectance; Vibrations in symmetry C_{3v} ; Crystal structure; Preparation; Thermoanalyses; Raman-high-temperature-spectra; Cobalt; Nickel; Zinc;