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“STRUCTURE AND SPECTROSCOPY OF NEW CADMIUM(II) COORDINATION POLYMERS AND SUPRAMOLECULAR COMPOUNDS”

Search and examination of new materials showing various and useful physicochemical properties is one of main research trends of contemporary coordination chemistry. Designing and synthesis of new organic-inorganic hybrid materials enable us to fulfil this scientific purpose. Structure of such systems is based mainly on structurally adjusted and connected building blocks, which lay the foundation of molecular recognition. By means of complicated molecular recognition processes, it is possible to provoke molecules to get into process of a *self-assembly* or *auto-association.* Properties of hybrid materials constructed in such a way result, to some extent, from individual properties of building blocks, on the other hand, they are also a consequence of new structural conditions imposed on starting components.

The main goal of this dissertation was to study and understand of the role of covalent (metal-ligand coordination bond) and non-covalent interactions (hydrogen bonds, π-π staking interactions) in a process of formation of new cadmium(II) organic-inorganic hybrid materials based on pseudohalides connectors, and in a further step - to define influence of inorganic and organic ligands on fluorescent and thermal properties of the obtained coordination compounds.

As a results of the studies, I have obtained 33 new cadmium(II) coordination compounds in a monocrystalline form, among them: 17 coordination polymers, 8 mononuclear compounds, 3 dinuclear compounds and 5 tetranuclear structures. For all of the obtained coordination compounds, molecular structures were confirmed unequivocally by means of the X-ray single analysis. I determined the geometry of coordination sphere of the metallic center, geometry of ‘metal–bridging spacer–metal’ moiety, coordination mode and symmetry of bridging ion as well as topology of the multidimensional structure.

The results of structural studies were correlated with results of spectroscopic and thermal studies. It enabled me to fully characterize of the obtained organic-inorganic hybrid materials and present an analysis of structural trends, important from the point of view of crystal engineering and designing of new materials.