

MS35-P24 | SUPRAMOLECULAR ASSEMBLIES OF COPPER(II) COMPLEXES: SUPRAMOLECULAR SYNTHON TRANSFERABILITY AND MAGNETIC PROPERTIES

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In the pursuit of new technologies there is exigency for novel materials with desired physical and chemical properties. Despite the fact that metal-based crystalline solids provide an access to properties that are typically unavailable or difficult to achieve in metal-free settings (i.e. magnetic or optical). Hydrogen and halogen bonds have proven to be invaluable crystal engineering tools and their use in the design of organic systems has already been well documented, but introduction of metal cations and charge-balancing entities into metal-free solids commonly disrupt well established connectivity of the key functional groups. Therefore, our aim is to study transferability of supramolecular synthons from organic to metal-organic systems, and to correlate supramolecular connectivity of metal-based building units with a number of bulk crystal properties, in particular magnetic and mechanical.

For that purpose, we prepared a series of 1-D halide coordination polymers of copper(II) with the amine and amide derivatives of pyridine, pyrazine and pyrimidine. The targeted octahedral geometry was achieved for all structurally described complexes, $[\text{CuCl}_2(2\text{-NH}_2\text{pz})_2]_n$, $[\text{CuCl}_2(2\text{-pyz})_2]_n$, $[\text{CuCl}_2(4\text{-pym})_2]_n$ and $[\text{CuBr}_2(4\text{-pym})_2]_n$, as well as the desired connectivity via N-H...O/N interactions. It was found that the halide ions do not have disruptive effect on the supramolecular motif C(4), which remained preserved as in purely organic systems. Antiferromagnetic spin chain behaviour, described by Bonner-Fischers model, was observed for all prepared complexes. Also, impact of the counter ion and Cu-X...Cu angles on superexchange interaction is observed.