Our current research activities are focused on two families of compounds exhibiting nanostructured networks: a) pillared materials consisting of chiral cationic and anionic complexes and b) silver-deficient salts.

The prototype of the first family of compounds is the salt, catena-\([\text{Co}^3\text{II}(\text{H}_2\text{oxado})_3\text{II}(\text{C}_2\text{O}_4)_3\text{I}_5\text{H}_2\text{O})\] (H$_2$oxado = oxamide dioxime) \[1\]. It consists of hydrogen-bonded pillars of alternating chiral complex cations and anions with equivalent opposite charges (3+ vs 3-) generating, therefore, an overall electrically neutral lattice network that delineates nanochannels hosting hydrogen-bonded water-guest molecules. The other salt of the same family, catena-\([\text{H}_3\text{O}\text{I}][\text{MI}\text{I}(\text{H}_2\text{O})_3\text{I}\text{II}(\text{H}_2\text{oxado})_3\text{II}(\text{C}_2\text{O}_4)_3\text{I}_2\text{H}_2\text{O})\], MI = K+, Li+) \[2\], by contrast, consists of a stacking pattern of dipositive (2+) and trinegative (3-) complex ions. Thus, the resulting host lattice network carries a negative charge cancelled together by protons and group 1 metal cations encapsulated within the water-filled channels.

On the other hand, we have obtained a silver-deficient salt Ag$_{11.60}$H$_{0.40}$[Cr(C$_2$O$_4$)$_3$]$_4$$\cdot$15H$_2$O \[3\] in which the [Ag$_{2.9}\text{I}^3\text{II}(\text{C}_2\text{O}_4)_3]$^0.1$- lattice grid carries a negative excess charge (-0.1) cancelled by an equivalent fraction of 0.1 proton residing within "water streams" in the channels. We now have been able to obtain other members of this family of silver-deficient compounds with substantial increase in H$_3$O$^+$ and substantial decrease in Ag$^+$.

Such systems with protons residing within hydrogen-bonded water molecules in the channels could be suitable to monitor proton transport processes in the solid state.


**Keywords:** Coordination polymers, Nanochannels, Proton transport processes