Title: **Porous metallic complexes with polycarboxylic binders**

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Supramolecular chemistry is a part of chemistry in which metal-ligand interactions have been included. Within this group, different structures are formed including metal-organic frames (MOF) that form porous materials, then we have nanocapsules, that form a single structure with a pore, like a ball.

There are topological materials that are conductive compounds on their surface and insulators in their bulk phase. Currently, only Bi_2Se_3 or Bi_2Te_3 compounds are known. The present of an inversion point helps to project the topological properties, thus, most of the topological systems are centrosymmetric. In this research we want to synthesize a bismuth compound with an organic ligand to see if we can obtain these properties. To do so, we perform a solvothermal reaction to synthesize a centrosymmetric MOF with Bi^{III} cations.

Another part of the work is to synthesize a rhodium complex with the ligand heptazine, where the heptazine is synthesized from the pyrolysis of the urea forming a polymer. After this reaction, it is hydrolysed, obtaining a functional derivative of heptazine in order to make a nucleophilic substitution and obtain the ligand tris(piperidine-4-carboxylicacid)-1,5,9-heptazine(tpach). Finally, a nanocapsule is synthesized under different conditions: with a solvothermal reaction, at atmospheric pressure or with the formation of an azeotrope.

The characterization of the compound from the solvothermal reaction is not as expected, since we do not seem to have the product. On the other hand, the ligand characterization was finally as expected, although it could be improved since the NMR spectrum shows a lot of water and unidentified peaks, which could be impurities as damaged ligand. Finally, for reasons of time, we cannot finish defining a route for the synthesis of the complex.

Keywords: Supramolecular chemistry, metal-organic framework, nanocapsule, topological, solvothermal, azeotrope.