A journey from chiral luminescent iridium(III) complexes to copper(I) metalloligands and their self-assembly into chiral supramolecular (in)finite architectures

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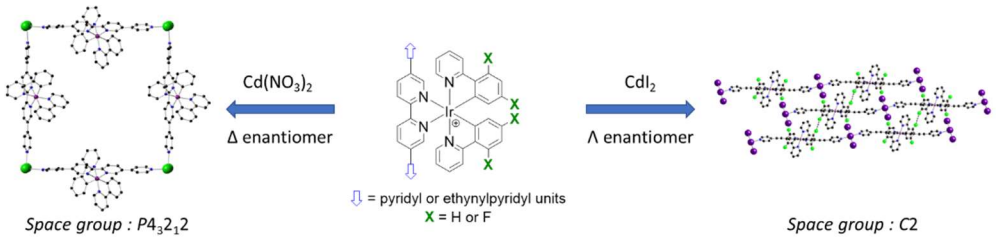
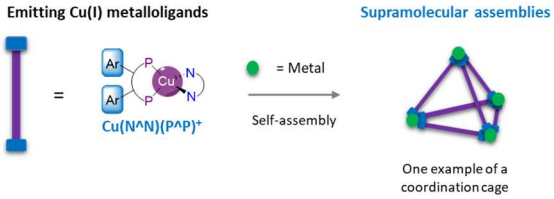
As demonstrated more than a century ago by Alfred Werner,[1] molecular chirality in coordination compounds may originate not only from the ligands but also from the metal atom itself. Quite surprisingly, while several chiral-at-metal complexes have been reported, few cases deal with their use as chiral building blocks for the generation of heterometallic coordination polymers (CP), also known as mixed-metal-organic frameworks.[2] Indeed, in most of the examples employing chiral coordination compounds as metallatectons or metalloligands, the chirality is associated with the presence of asymmetric carbon atoms on the metalloligand scaffold. Furthermore, whereas *tris*-chelate octahedral Iridium complexes have been used to form luminescent CPs,[3] their intrinsic chirality is usually not exploited and those metalloligands are employed as racemates. In this presentation, the synthesis of a family of chiral-at-metal *tris*-chelate Iridium complexes that combine chiral and luminescent information and are equipped with peripheral coordination sites will be detailed. Formation of luminescent heterometallic CPs thereof will also be discussed.[4]



General chemical structure of some iridium complexes studied and X-Ray structures of two enantiopure heterometallic CPs obtained

However, iridium is a rare and precious metal and its cost limits its applications. In order to develop luminescent and chiral building blocks, we are currently developing new emitting copper(I) complexes as (metallo)ligands in order to form chiral luminescent supramolecular coordination cages.[5] In parallel, development of new chiral photoactive Cu(I) complexes is underway. We will expose briefly our first results dealing with this new approach.



General chemical structure of copper complexes and coordination cages formed thereof

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