# Construction of Metal Organic Nanotubes by Stereochemically Supramolecular Polymerization

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Many beautiful helical structures, either with left-handedness or right-handedness, have been built using mostly point or axial chiral molecules. However, it is still a big challenge to assemble the molecules with a planar chirality into an ordered structure. Ferrocene (**Fc**) has two cyclopentadienyl rings bound on opposite sides of a central iron atom and is used as a structural motif to construct asymmetrical molecules[1]. When the ferrocene is equipped with asymmetrical substituents on its two rings, planar chirality forms. Considering its dynamic nature as well as its geometrical bulkiness and complexity, constructing an ordered structure by such a planar chiral ferrocene-based molecule has never been realized so far.

The main goal of my research is to construct a chiral structure by using planar chiral ferrocene-based molecules. A bent-shaped ferrocene-based ligand (**FcL**) has been designed and synthesized. Owing to the different spatial distribution of these four pyridyl groups[2], two stereoisomers with opposite planar chirality will form (Fig. 1c). Taking advantage of the well-established coordination chemistry between the pyridyl groups and silver ions (Fig. 1a), we expect the formation of nanorings by connecting the ligands through $Ag^+$ and thus form chiral nanotubes (Fig. 1c). The impact of the completion of this research could be significant in the fields of coordination and supramolecular chemistry. This project may put forward a new method to approach the precise control of chiral assembly.

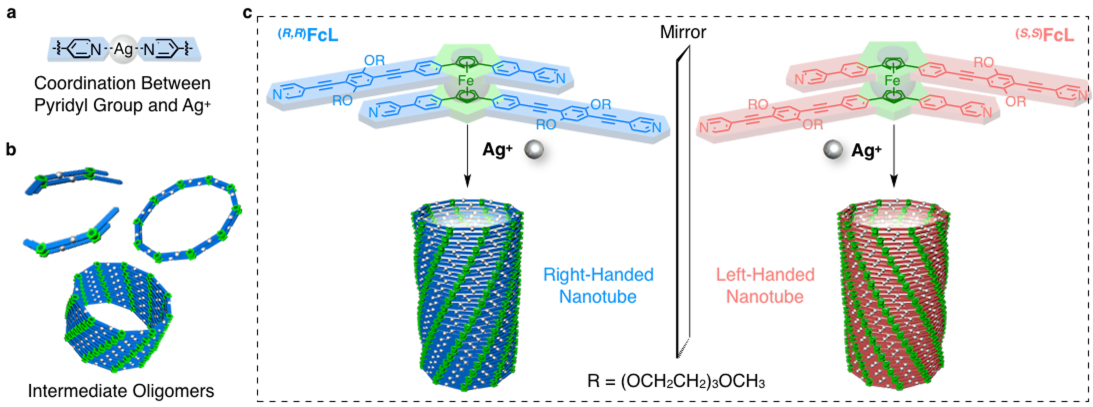


**Fig. 1. a,** Coordination between the pyridyl groups and silver ions. **b,** Oligomers formed in the initial stage of assembly. **c,** Schematic illustration of the assembly structures of planar chiral ferrocene ligands and $Ag^+$.

1) Ramón Gómez Arrayμs, *Angew. Chem. Int. Ed.* **2006**, *45*, 7674. 2) Fukino, *Science*, **2014**, *344*, 499.