

SUPRAMOLECULAR „SOFT“ ASSEMBLIES BASED ON COPPER(I) COORDINATION COMPLEXES

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Copper(I) coordination complexes with N^N chelating oligopyridines are valuable candidates for applications in solar energy conversion¹ or lightning technologies² because of their excellent photophysical and photochemical properties and for the low cost and ready availability of the metal. The most attractive systems are based on ligands able to stabilise their tetrahedral geometry (D_{2d} symmetry) and to hinder the flattening distortions which facilitates oxidation to Cu(II) species.³

Herein we present the synthesis and characterisation of new stable Cu(I) complexes based on functionalised 2,2'-biquinoline ligands (Figure 1) that self-assemble into “soft” supramolecular architectures.

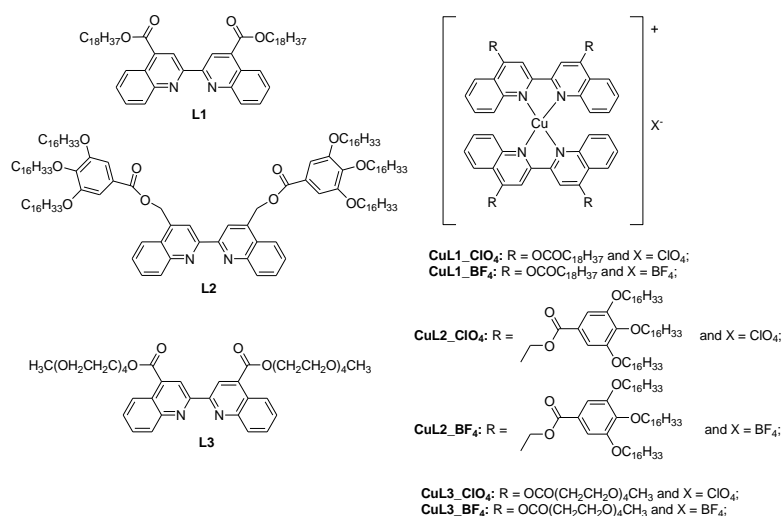


Figure 1. Chemical structure of ligands L1-L3 and their Cu(I) complexes CuL_n_X, where X = ClO₄ or BF₄.

The stoichiometry and purity of all compounds were determined using elemental analyses, Atomic Absorption, IR and ¹H NMR spectroscopies. The functionalisation of the biquinoline ligand with long alkyl chains yielded thermotropic liquid crystalline systems (CuL1_X and CuL2_X), whereas insertion of hydrophilic groups promoted the assembly in water into supramolecular aggregates (CuL3_X).

The thermal behaviour of complexes CuL_n_X with n = 1 and 2 was investigated by polarized optical microscopy (POM) and differential scanning calorimetry (DSC). UV-Vis studies on CuL3_X evidenced the presence of supramolecular aggregates in water. Stabilization of Cu(I) systems can be also achieved by building supramolecular assemblies and thus blocking the

fluxional process towards a distorted “Cu(II)-like” geometry in concentrated solution of complexes.

Acknowledgements

Authors are thankful to the Romanian Academy of Science (Project 4.1.).

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