

NEW 3d METAL COORDINATION COMPLEXES WITH N- AND O- DONOR LIGANDS: SYNTHESIS, STRUCTURAL CHARACTERIZATION AND OPTICAL PROPERTIES

Ildiko Bută, Carmen Cretu, Evelyn Popa, Elisabeta I. Szerb

“Coriolan Dragulescu” Institute of Chemistry, Timisoara, Romania
e-mail: ildiko.but@gmail.com

Abstract

Liquid crystals are anisotropic fluids, where the combination of flow and molecular ordering confers interesting optical, dielectric, and visco-elastic properties [1]. Liquid crystals have been intensively studied as functional materials in the fields of energy, water, photonics, actuation, sensing, and biotechnology [2].

Here, we present the synthesis of two isostructural Ni^{II} and Zn^{II} coordination complexes based on N^N-chelating ligands (2,2'-bipyridine and 1,10-phenanthroline) and an O-donor ligand (3,4,5-tridodecyloxybenzoate) and their structural characterization by spectroscopic and analytic methods.

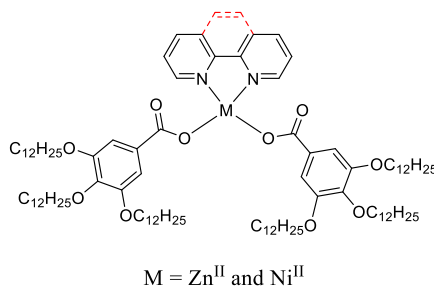


Figure 1. Proposed structures of Ni^{II} and Zn^{II} complexes

The complexes self-assemble into liquid crystalline supramolecular architectures, their mesomorphic properties being investigated by a combination of Polarized Optical Microscopy (POM) and Differential Scanning Calorimetry (DSC) techniques. The metallomesogens show typical columnar textures and are liquid crystalline over a wide range of temperatures. Interestingly, the mixtures obtained by simply mixing the complexes in different molar ratios show different thermal and mesomorphic behaviors comparative with their precursor complexes, depending on their composition. Preliminary results regarding the emission properties of the complexes and the new materials are presented.

References

1. M. Hird, Chem. Soc. Rev. 36 (2007) 2070.
2. J. Uchida, B. Soberats, M. Gupta, T. Kato, Adv. Matt. 34 (2022) 109063.

Acknowledgements:

We thank the Romanian Academy, Institute of Chemistry “Coriolan Dragulescu” (Project 4.1.3) for financial support. This work was supported by a grant of the Romanian Ministry of Education and Research, CNCS - UEFISCDI, project number PN-III-P4-ID-PCE-2020-1958, within PNCDI III.