FINAL MASTER PROJECT PROPOSAL

Title

Preparation and study of functional nanostructures from nitrogen-rich molecules

Supervisor(s)

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Summary of the project

Nanostructured organic materials, with defined molecular architectures, show interesting properties in different areas of technology, such as organic optoelectronics or sensors. In particular, our group (Liquid Crystal and Polymers group, https://liquidcrystals.unizar.es/) is investigating on flat pi-conjugated nitrogen-rich molecules that show fluorescence and electron-acceptor character, as well as high tendency to self-organize in functional nanostructures (Figure 1). These molecules allow to successfully develop materials with control of the molecular architectures from the nanoscale to the macroscale, and interesting optoelectronic properties.

The objective of the work proposed for this master project is to study the formation of nanostructures in new related molecules.

The work methodology will consist on:

a) Chemical synthesis and structural characterization (NMR, FTIR, EM, elemental analysis) of nitrogen-rich molecules.

b) Preparation of nanostructures, study of their molecular architecture and morphology (XRD, TEM), and study of properties in different conditions (mesophase, solution, thin film).

c) Study of the properties as a function of aggregation.

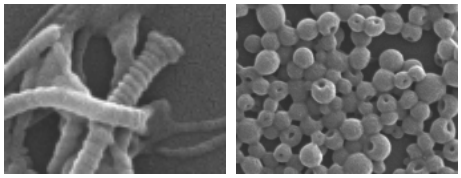

Figure1. Functional nanostructures prepared from a nitrogen-rich pi-conjugated small organic molecule