

*Title:* **Preparation and characterization of lyotropic liquid crystals based on cellulose nanocrystals**

*Student:* Clara Fabregat Pallejà

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*Supervisor/s:* Dr. Jordi Ignés Mulo

*Departament of Materials Science and Physical Chemistry*

Throughout these last decades, there have been extensive research on liquids crystals (LCs). Materials in this state of matter present a special type of molecule ordering, which results in anisotropy and is responsible for their tunable properties. For this reason, there is a growing demand for LCs, most remarkably in electronics for displays of devices, as well as in thermometers or paints for vehicles. Among the different types of LCs, there are the lyotropic LCs, which are induced by solvent concentration of amphiphilic molecules. An example of this is aqueous suspension of cellulose nanocrystals (CNCs).

CNCs are rod-like highly crystalline nanoparticles of cellulose, one of the most widely found biopolymers in nature. Recently, there has been an increasing interest in CNCs since they are biocompatible, cheap and feature an attractive combination of thermo-mechanical properties. Therefore, this material is used in a wide range of sectors, for instance the biomedical, energy and electronics fields.

This project aims to prepare lyotropic LCs based on CNCs from raw material (cotton fibre) as well as from commercial nanocrystals and to study its LC phase behaviour in function of the concentration and temperature. On the other hand, emulsions of this LC will be proceeded and a less known utility of microfluidic devices will be shown. Improvements of this technique for LCs emulsification could allow the development of new optical devices.

**Keywords:** Liquid crystals, lyotropic liquid crystals, cellulose nanocrystals, microfluidics, emulsions, cellulose, liquid crystal phase.