Title: **Formation of chromonic liquid crystals from dyes and their confinement in water-in-oil and water-in-water emulsions.**

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Chromonics are an interesting class of lyotropic liquid crystals with several potential medical and technological applications. Their confinement in emulsions provides an opportunity to design advanced organic-based materials. In this work, 9 dyes are tested in order to establish chromonic behaviour. Their phases are characterized using Polarized Optical Microscopy and Small Angle X-Ray Scattering (SAXS). Some of them are used for the formulation of stable water-in-oil (W/O) and water-in-water (W/W) emulsions, which are characterized using rheological techniques.

Mesogenic phases were observed in seven of the nine studied dyes. Acid red 27, Alcian blue (chloride and acetate salts), Congo red and Neutral red acetate formed chromonic nematic (N_c phase) and hexagonal (M phase) columnar phases. The structure of their phases was not characterized due to partial insolubility.

The representative chromonic phases are shown through the partial phase diagram of nickel (II) phthalocyanine tetra-sulfonic acid. This compound stacks in cylindrical columns in both N_c and M phases, with a diameter of one molecule.

Two of the studied dyes were used to formulate the emulsion confinement. Representative optical textures of these systems were observed, as star-like and tactoid forms. The chromonic nematic phase of pinacyanol acetate was confined in drops of W/O emulsions with polydimethylsiloxane, vinyldimethylsiloxy terminated as the oil phase. The drop size was highly polydisperse and above 2 μm. This emulsion showed a Newtonian rheology behaviour. Nickel (II) phthalocyanine tetra-sulfonic acid chromonic nematic phase was confined in W/W emulsions with added polyvinylpirrolydone. The W/W emulsion presented a polydisperse drop size larger than 1 μm and showed a Newtonian behaviour. Other oils, surfactants and polymers were tested.

Keywords: Emulsion confinement. Lyotropic Chromonic Liquid Crystals. Water-in-water emulsions. Water-in-oil emulsions.