

Title: **The role of the supramolecular chirality of 5,10,15,20-tetrakis(4-sulfonatophenyl)porphyrin aggregates on an asymmetric organocatalytic reaction.**

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In this project the possibility of transferring the chirality from the supramolecular level to an asymmetric carbon atom is studied. Chiral supramolecular aggregates are prepared by self-assembly of a water-soluble sulfonated achiral tetraphenylsubstituted porphyrin, the achiral 5,10,15,20-tetrakis(4-sulfonatophenyl)porphyrin. The chirality and the stability of these J-aggregates is studied by spectroscopic methods such as UV-Vis and circular dichroism.

This porphyrin shows, in acidic aqueous medium, spontaneous mirror symmetry breaking during its aggregation process and will be used as a chiral counteranion in an ACDC (Asymmetric Counteranion Directed Catalysis) strategy on a Diels-Alder organocatalytic reaction. The reaction proceeds through an iminium cationic intermediate with the purpose of finally achieving the transfer of chirality from the supramolecular scale to the resulting enantiomeric excesses of the reaction products. To achieve this, the zwitterionic form of the porphyrin free of additional metal cations and counteranions—which would prevent the ACDC strategy—has been prepared. New experiments are presented in order to show if the chirality has really been transferred by the supramolecular aggregates or, on the contrary, the chiral selectors used to determine the supramolecular chiral sign of the aggregates have an influence in the process.

Keywords: supramolecular chemistry, chirality, porphyrins, spontaneous mirror symmetry breaking, organocatalysis, Assymmetric Counteranion Directed Catalysis, enantiomeric excesses.