

Self-association of 5,10,15,20-tetrakis-(4-sulfonatophenyl)-porphyrin tuned by poly(decylviologen) and sulfobutylether- β -cyclodextrin

Flores M.E.

Sano N.

Araya-Hermosilla R.

Shibue T.

Olea A.F.

Nishide H.

Moreno-Villoslada I.

With the aim of achieving supramolecular structures containing dyes with controlled state of aggregation, the formation of ternary complexes between 5,10,15,20-tetrakis-(4-sulfonatophenyl)-porphyrin, poly(decylviologen), and sulfobutylether- β -cyclodextrin at low excess of the cyclodextrin is described. By controlling the stoichiometry of the reactants, both non-fluorescent H-aggregates of the dye and stabilized fluorescent monomers may be obtained. The dye undergoes self-aggregation in the presence of the flexible, cationic polymer, and by addition of the negatively charged cyclodextrin the aggregates are cleaved. The cyclodextrin primarily induces the inclusion of 5,10,15,20-tetrakis-(4-sulfonatophenyl)-porphyrin in its cavity, and the ensemble is stabilized by the polymer by means of electrostatic, hydrophobic, and/or aromatic-aromatic interactions. The ternary complex thus produced tends to nanofiber formation, as seen by FE-TEM. © 2014 Elsevier Ltd. All rights reserved.

5,10,15,20-Tetrakis-(4-sulfonatophenyl)-porphyrin

Kinetics

Molecular assembly

Poly(decylviologen)

Sulfobutylether- β - cyclodextrin

Ternary complex

Agglomeration

Aggregates

Aromatic compounds

Association reactions

Enzyme kinetics

Fluorescence

Porphyrins

Aromatic-aromatic interactions

Cationic polymers

Molecular assembly

Negatively charged

Poly(decylviologen)

Self-associations

Supramolecular structure

Ternary complex

Cyclodextrins