Restricting the Shape-Assisted Self-Assembly of Carpyridines to One Dimension

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Shape-Assisted Self-Assembly (SASA) is a process in which the shape of a monomeric unit enforces the order between monomeric units needed for supramolecular assemblies in the absence of strong non-covalent interactions such as H-bonding.¹⁻³ Saddle-shaped molecules stand out for these processes due to the translational and rotational rigidity of the monomers within the stacks. Carpyridines (CPs) are porphyrin-related metal-containing macrocycles bearing two carbazole and two pyridine units alternately connected through ortho aryl-aryl bonds.^{1,2} This arrangement results in a saddle-shaped structure, where prefunctionalized building blocks allow the synthesis and tuning of properties of these macrocycles. These units have shown to be effective towards supramolecular assembly purely based on p-p interactions and assisted by the shape of the monomers, demonstrating the significance of shape in self-assembly processes. Alkyl substitution onto the carbazoles has allowed us to study 2D sheet formation,^{1,2} which combined with substitution onto the pyridines with different side chains allows us to study the mechanism of assembly of the monomers into oligomers, and ultimately, into micrometer-long fibers.⁴



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