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Construction and Unique Host Capability of Polyaromatic Micelles with Anthracene Rings

Abstract

The majority of synthetic organic compounds without aqueous substituents are practically insoluble in water. The development of universal solubilizing reagents for various organic compounds as well as more convenient and practical solubilizing methods are required to explore green chemistry in aqueous media. In this thesis, I report the preparation of V-shaped amphiphilic molecules containing two anthracene rings and the spontaneous formation of micelle-like molecular capsules in water via hydrophobic effects and aromatic-aromatic interactions. The micellar capsules encapsulated hydrophobic guests in water, and the resultant nano-composites exhibited efficient energy transfer. Functionalization of the polyaromatic shells of micellar capsules was accomplished by simple functionalization of the amphiphilic subunits. The shell-functionalization drastically enhanced the host-guest interaction. Furthermore, a wide range of nanocarbons can be solubilized in water through simple grinding operations with V-shaped polyaromatic amphiphiles.