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Stereo-Directed Construction and Host Capability of Multiple Anthracene Nano-Assemblies

Abstract

Regulation of stereochemistry is one of the key factors determining the structure and function of supramolecular architectures. This thesis describes the preparation of four types of multiple anthracene nano-assemblies possessing host capabilities from stereo-regulated amphiphilic compounds. A tape-shaped amphiphile composed of three anthracene rings, which exists two stereoisomers, showed selective formation of a dimeric capsule capable of binding small guests through charge-transfer interactions. Stereo-selective synthesis of a U-shaped anthracene tetramer and quantitative formation of a fluorescent capsule were accomplished. The capsule acts as a new fluorescent probe for natural monoterpene compounds. To demonstrate the rigidity and flexibility effects on host frameworks, tribranched anthracene amphiphiles with two types of cores were designed. These amphiphiles formed different types of host-guest composites with fluorescent dyes and the encapsulated guest molecules exhibited unusual emission properties.