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Structure of PEO-b-PPO-b-PEO Triblock Copolymer Inclusion Complexes with Beta-Cyclodextrin CHI-CHUN TSAI, STEPHEN Z.D. CHENG, BERNARD LOTZ, JIN HUANG, YONGMING CHEN — Inclusion complexes, formed by non-covalent host-guest interactions, have been extensively investigated because they can be useful as building blocks for constructing supramolecular structures. Cyclodextrins (CDs), due to their good water-solubility and ability to include a wide range of guest molecules, have been the most intensively studied host molecules. CDs are shaped like a shallow truncated cone, with a hydrophilic outer surface as well as primary (narrower end) and secondary (wider end) hydroxyl groups on the rim of the molecule. The cavity, which is constructed with alkyl groups and glycosidic oxygen atoms, is hydrophobic and can act as a host for a great variety of hydrophobic molecular guests. A series of host-guest inclusion complexes were prepared with beta-cyclodextrin (beta-CD) and PEO-PPO-PEO triblock copolymers of varying molecular weights and compositions. The middle PPO block of the copolymers can be selectively included by beta-CD to form an inclusion complex while the PEO blocks cannot. These inclusion complexes can further self-assembled into supramolecular structures in aqueous solution. The inclusion complexes and self-assembled supramolecular structures were characterized by Nuclear Magnetic Resonance, X-ray diffraction, and Differential Scanning Calorimetry experimental methods.

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