

Architecture and Properties of Several Molecular Aggregate Nanostructures

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We have designed and synthesized functional molecules with structural features that favor assembly into aggregate nanostructures via combination of intermolecular interactions and self-assembly techniques. These large-area ordered molecular aggregate nanostructures are based on a variety of molecular structures such as perylenes, anthracenes, porphyrins, polydiacetylenes, fullerenes and their derivatives. We have also developed new methods to construct these larger structures including organic vapor-solid phase reaction, natural growth, association via self-polymerization and self-organization, and a combination of self-assembly and electrochemical growth. These methods are both facile and reliable, allowing us to produce ordered and aligned aggregate nanostructures, such as large-area arrays of nanowires, nanorods, and nanotubes. Large-area ordered aggregate structures exhibit interesting electrical, optical, and optoelectronic properties for applications in next-generation electronic and optoelectronic devices.

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- 2) Liu, H. B.; Xu, J. L.; Li, Y. J.; Li, Y. L. *Acc. Chem. Res.* **2010**, 43, 1496.