

Preface

In the future, many modern materials will be increasingly based on the assembly of preformed molecular entities. Their structural characteristics and functional properties will be programmed at the molecular level and their formation as a completed entity will be achieved by self-assembly processes. This in essence is a bottom-up approach and its success will require a deep understanding not only of the chemistry of intermolecular interactions and associations but also of self-assembly processes in the condensed phase. Among various interesting innovations brought about by the development of supramolecular chemistry, supramolecular synthesis is a particularly powerful approach for the design and generation of molecular architectures displaying both structural and functional complexity. The combination of molecular synthesis (which allows chemists to design and prepare extremely sophisticated biotic and abiotic molecules through the interconnection of atoms or group of atoms by strong covalent bonds) and supramolecular synthesis (which orchestrates the association of molecules by recognition processes through the use of weak and reversible interactions) opens up endless structural and functional possibilities. Following the perceptive observation by Dunitz that “*A crystal is, in a sense, the supramolecule par excellence*”, molecular crystals may be seen as infinite periodic architectures resulting from the interconnection of building blocks or tectons capable of self-assembling through specific recognising events. Thus, one may regard the formation of a molecular crystal as a subset of supramolecular synthesis based on the generation of crystalline materials with defined connectivity patterns between molecular components which makes up the solid material. The iterative recognition events responsible for the formation of crystalline architectures may be based on a variety of intermolecular interactions such as van der Waals’ contacts, hydrogen- or coordination bonds and electrostatic interactions. These attractive forces may be employed separately or may be combined in a co-operative manner. This volume, by bringing together contributions by some of the most active and eminent researchers in this area, gives an updated overview of this important and emerging area of research.

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