

Supramolecular Main-Group Chemistry
Ignacio Vargas-Baca

Abstract

Until now most work in supramolecular chemistry has relied on intermolecular links like hydrogen-bonding and the binding of metal ions to electron-rich molecules. In recent years, the affinity of atoms of elements like iodine for atoms bearing lone pairs of electrons has received much attention and the term “halogen bond” has formally been adopted by the International Union of Pure and Applied Chemistry to describe it. Other heavy elements, also from the p-block of the periodic table, have analogous abilities to form supramolecular links.

The Vargas group has pioneered in Canada the systematic study of the application of the supramolecular interactions formed by atoms of sulfur, selenium and tellurium (collectively called “the chalcogens”) to construct functional supramolecular structures. For example, infinite supramolecular chains of tellurium-containing molecules have been manipulated to engineer crystals with special optical properties such as chromotropism and second harmonic generation.¹ A recent achievement is the first demonstration of the ability of tellurium-oxygen “chalcogen bonds” to induce the spontaneous assembly of discrete, well-defined, aggregates of a few molecules that together possess properties and perform the functions of new molecular entities.² These investigations pursue a fundamental understanding of such assemblies but knowledge derived from this is work is highly relevant to applications in areas as diverse as chemical synthesis, optical technologies, electronics and inorganic polymers.

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2. (a) P.C. Ho, P. Szydlowski , P.J.W. Elder , J. Sinclair , J. Kübel , C. Gendy , L.M. Lee , H. Jenkins , J. F. Britten, D. R. Morim, I. Vargas-Baca, *Nat. Commun.* **2016**, 7, 11299; (b) P.C. Ho, J. Rafique, L.M. Lee, H.A. Jenkins, J.F. Britten, A.L. Braga, I. Vargas-Baca, *Dalton Trans.*, **2017**, 46, 6570; (c) P.C. Ho, H.A. Jenkins, J.F. Britten, I. Vargas-Baca, *Faraday Disc.*, **2017**, 203, 187.