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Latest News

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CHEMICAL BONDING

Conflicting Inorganic Aromaticity

$Te_2As_2^{2-}$ cluster anion is first isolated compound shown to possess both aromatic and antiaromatic bonding

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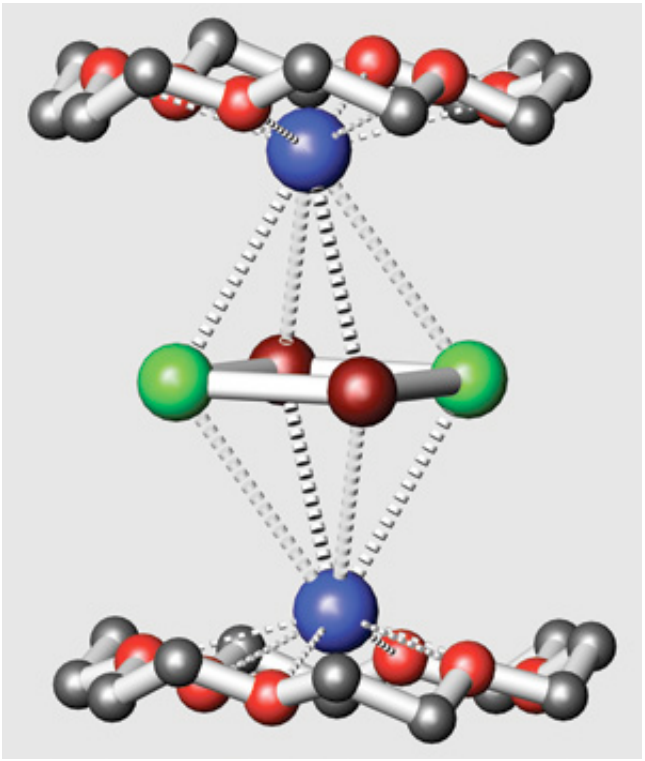

J. AM. CHEM. SOC.

$[K(18\text{-crown-6})]_2[Te_2As_2]$

Aromaticity and antiaromaticity, once purely the domain of organic chemistry, has expanded in recent years to include organometallic complexes, all-metal clusters, and main-group compounds. In a new example, Angel Ugrinov and Ayusman Sen of Pennsylvania State University, together with Arthur C. Reber, Meichun Qian, and Shiv N. Khanna of Virginia Commonwealth University and coworkers report the synthesis and crystal structure of $Te_2As_2^{2-}$, the first four-membered ring Zintl anion made from a

combination of group 15 and 16 elements (*J. Am. Chem. Soc.* **2008,** *130,* 782).

The planar anion, sandwiched between two potassium 18-crown-6 units, has alternating Te—As bond lengths and angles that give it a parallelogram geometry. The structure and molecular orbital analyses reveal a quite unusual electronic structure for the anion: σ-antiaromatic bonding coupled with π-aromatic bonding and a triplet electronic ground state, which leads to the distorted square shape and net aromatic character. While similar systems with this "conflicting aromaticity" have previously been observed in the gas phase, $Te_2As_2^{2-}$ is the first example isolated as a solid.

The new compound is "truly remarkable," notes computational chemist Alexander I. Boldyrev of Utah State University. "It represents a further advance of novel bonding concepts in inorganic chemistry," he says.

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