Observation of d-orbital aromaticity

Aromaticity is a fundamental concept in planar cyclic hydrocarbons that has been expanded to organometallic complexes and all-metal clusters. Aromaticity typically is restricted to σ and π bonding, but computational evidence indicates that transition-metal clusters can have delocalized bonds involving d orbitals. Lai-Sheng Wang and his coworkers at Washington State University, Richland, and Pacific Northwest National Laboratory now report the first experimental evidence for d-orbital aromaticity (*Angew. Chem. Int. Ed.*, published online Oct. 17, dx.doi.org/10.1002/anie.200502678). The team created M_3O_9 (M = Mo, W) clusters by laser vaporization of the metals in the presence of O_2, then separated the oxide species in a mass spectrometer and characterized them by using photoelectron spectroscopy. On the basis of their experimental and computational data, the researchers conclude that d orbitals of the three coplanar metal atoms form an unoccupied molecular orbital at the center of the neutral clusters that is occupied by one or two electrons in the $M_3O_9^-$ or $M_3O_9^{2-}$ anion, respectively. Large resonance energies, equal metal-metal bond distances, and other attributes confirm that the anions are aromatic, Wang and coworkers say.

Solar cells go inorganic

Researchers have introduced a new type of solar cell, once limited to the theoretical realm, that is composed entirely of inorganic nanocrystals. Though the efficiency of the inorganic cells, 2.9%, is less than the average of 15% of commercial solar cells, the development may lead to a class of energy-conversion devices that is less expensive and more stable than its traditional silicon-based brethren. UC Berkeley chemistry professor A. Paul Alivisatos' team spin-