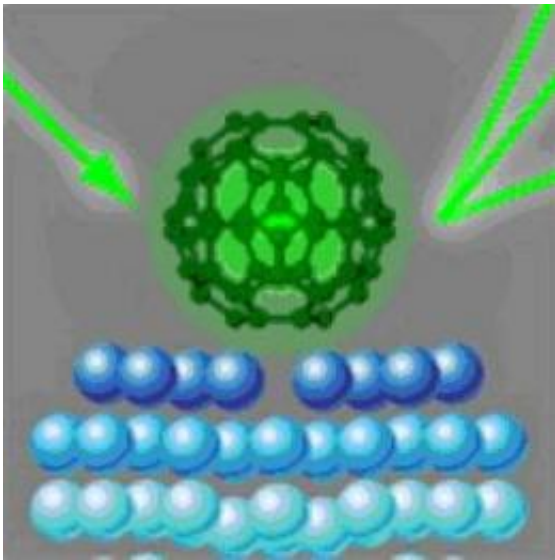


Nanophysics: Serving up Buckyballs on a silver platter

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Scientists have imaged the complete structure of C60 molecules on a silver surface with electron diffraction. Credit: Image copyright American Physical Society [Illustration: Alan Stonebraker after H. I. Li et al.]

Scientists at Penn State University, in collaboration with institutes in the US, Finland, Germany and the UK, have figured out the long-sought structure of a layer of C60 - carbon buckyballs - on a silver surface. The results, which could help in the design of carbon nanostructure-based electronics are reported in *Physical Review Letters* and highlighted in the July 27th issue of APS's on-line journal *Physics*.

Ever since the 1985 discovery of C_{60} , this molecule, with its perfect geodesic dome shape has fascinated scientists, physicists, and chemists alike. Like a soccer ball, the molecule consists of 20 carbon hexagons and 12 carbon pentagons. The [electronic properties](#) of C_{60} are very unusual, and there is a massive research effort toward integrating it into molecular scale [electronic devices](#) like transistors and logic gates.

To do this, researchers need to know how the molecule forms bonds with a metal substrate, such as silver, which is commonly used as an electrode in devices. Now, Hsin-I Li, Renee Diehl, and colleagues have determined the geometry of C_{60} on a silver surface using a technique called low-energy electron diffraction.

They find that the silver atoms rearrange in such a way - namely, by forming a 'hole' beneath each C_{60} molecule - that reinforces the bonding between the [carbon](#) structure and the silver surface.

The measurements push the limits of surface science because the molecules and the re-arrangement of the underlying silver atoms are quite complex. The measurements thus open the door to studies of a large number of technologically and biologically important [molecules](#) on surfaces.

More information: physics.aps.org

Source: American Physical Society

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