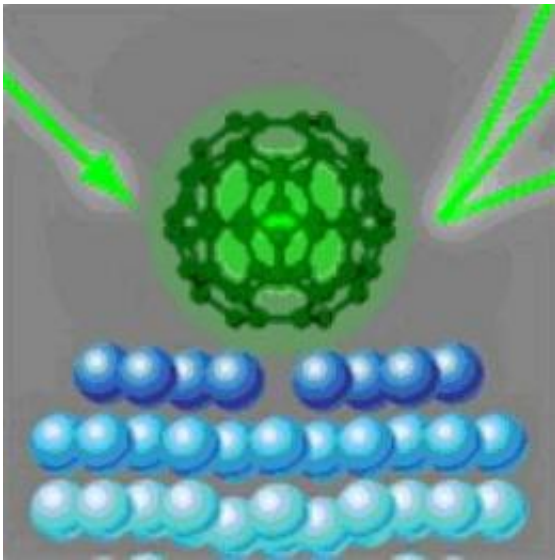


# Nanophysics: Serving up Buckyballs on a silver platter

July 27 2009

---



Scientists have imaged the complete structure of C<sub>60</sub> 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 C<sub>60</sub> - 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](https://physics.aps.org)

Source: American Physical Society

Citation: Nanophysics: Serving up Buckyballs on a silver platter (2009, July 27) retrieved 20 April 2024 from <https://phys.org/news/2009-07-nanophysics-buckyballs-silver-platter.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private

study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.