FINDINGS

16 Golden Atoms in Search of a Catchy Name

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Published: May 23, 2006

In tiny, tiny bits, gold makes exquisite geometry.

Pacific Northwest National Laboratory

SMALL GOLD The 16-atom cluster is about one-millionth the width of a period.

Clusters of 20 gold atoms, for example, always come in the shape of a pyramid, perfect for a subatomic King Tut.

Now scientists have found a new, unexpected configuration: a cage consisting of just 16 atoms, the smallest hollow piece of 24-karat gold possible.

"The cage structures were not expected, because metal clusters tend to be more compact," said Lai-Sheng Wang, who is a physicist at Washington State University and Pacific Northwest National Laboratory.

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The gold cage, with gemlike triangular facets, is the metallic equivalent of buckyballs, molecules consisting of 60 carbon atoms in the shape of soccer balls that were discovered in 1995. Buckyballs made a splash in the scientific world and beyond with their novel, but easy to describe shape. The catchy name helped, too.

Until now, no one has made similar hollow structures out of metals.

Nano-size gold has unusual, useful properties; for one, it acts as a catalyst for speeding up certain chemical reactions. Dr. Wang was interested in the way the properties of gold change

with size and shape.

Clusters with 13 or fewer atoms are flat sheets. Dr. Wang and his collaborator, Xiao Cheng Zeng of the University of Nebraska, thought there might be interesting shapes for clusters of 14 to 19 atoms.

The scientists vaporized a piece of gold with a laser and then examined the resulting bits. Among the debris, they found the 16-atom cages.

The findings will appear in the May 30 issue of The Proceedings of the National Academy of Sciences.

Next on the agenda, Dr. Wang said, is a ship-in-a-bottle trick. He says he wants to place some other atom inside the gold cage, which might endow the cluster with new and different characteristics.

But the golden cages seem unlikely to achieve the fame of buckyballs. For one thing, Dr. Wang has not thought of a catchy name.

"No, not for this one," he said.

Dr. Wang indeed has higher hopes for some of his other research. "I have something in the pipeline," he said, "that we have come up with cute names for."

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