

# Gold in the News

## A look at recent stories concerning gold

For more news stories related to gold please see the newsfeed at [www.utiliseGold.com](http://www.utiliseGold.com) which is updated regularly

### Golden crown

Chinese researchers have recently made a “golden crown” with a diameter of only a few nanometers. The molecular ring structure is held together exclusively by gold–gold bonds and is the largest ring system made of gold atoms produced to date containing 36 univalent gold atoms. The researchers, led by Shu-Yan Yu, Yi-Zhi Li, and Vivian Wing-Wah Yam started their synthesis with a ring system containing six gold atoms. Three of the gold atoms are linked into a triangle. Each of these gold atoms is attached to another gold atom that sticks out from the corner of the triangle. Three organic ligands are then bound to this flat double triangle to form a molecule that resembles a three-blade propeller. Six such “propellers” can be linked into a larger ring by means of a self-assembly process. Within this ring system, the gold atoms are arranged into a shape that resembles a crown: six double triangles are each bound to each other by two corners. The free double-corners point outward in a pattern that alternates above and below the plane of the ring.

See <http://chem.ruc.edu.cn/readnews.asp?newsid=338> for more information on this story.

### Update on gold ternary phase diagrams

For many metallurgists, the prime reference source of ternary phase diagrams for gold alloys is the book, ‘Phase Diagrams of Ternary Gold Alloys’, edited by A.Prince, G.V. Raynor & D.S. Evans, and published in 1990 by The Institute of Metals, U.K., (ISBN 0 904357 50 3). In a recent paper published in the Chinese journal *Precious Metals*, vol 29 (2), p47-54, May 2008, Kanghou Zhang reports on ‘recent developments in the investigation on ternary alloy systems containing gold (1996 – 2007)’. This review covers over 30 partial isothermal and vertical sections of phase diagrams published since 1996. Many of them relate to alloys of interest to the electrical and electronics industry but include gold-tin-X and gold-silver-X systems of relevance to other industries such as jewellery and soldering/brazing. Whilst published in Chinese, the references to the published phase diagrams are in English and provide a worthwhile reference list.

### Microalloying of gold

In a further paper published in the Chinese journal *Precious Metals*, vol 29 (2), p55-61, May 2008, Yuantao Ning reviews the microalloying of gold and gold alloys. This review, published in English, provides a more in depth scientific analysis of microalloying and the effect of different alloying metals on strengthening of gold and its alloys by solid solution and precipitation hardening. It also looks at the influence of such additions on refining grain size and increasing recrystallisation temperatures as well as the applications of such microalloyed gold materials. Several of the references are to Ning’s own work, many published in *Gold Bulletin* in recent years.

### Colour changing gold complex

According to recent story on the Chemical and Engineering News website Japanese researchers have reported how gentle grinding of a new Au(I) complex in solid form changes its luminescence behaviour. UV light reveals the induced change in the compound as it goes from blue to yellow. This color change, which can’t be viewed in visible light, can be reversed by exposing the fully ground powder to dichloromethane or other solvents. The researchers Hajime Ito, Masaya Sawamura, and colleagues at Hokkaido University, in Sapporo, detected no degradation in luminescence even after 20 cycles of blue-to-yellow conversion of the complex (*J. Am. Chem. Soc.*, DOI: 10.1021/ja8019356). X-ray and IR studies suggest that grinding transforms the more stable crystalline blue phase into an amorphous yellow phase and alters the coordination of the isocyanide ligands to the gold atoms. Such compounds could be used in recording and sensing devices, the authors suggest.

For more information see <http://pubs.acs.org/cen/news/86/i29/8629news6.html>