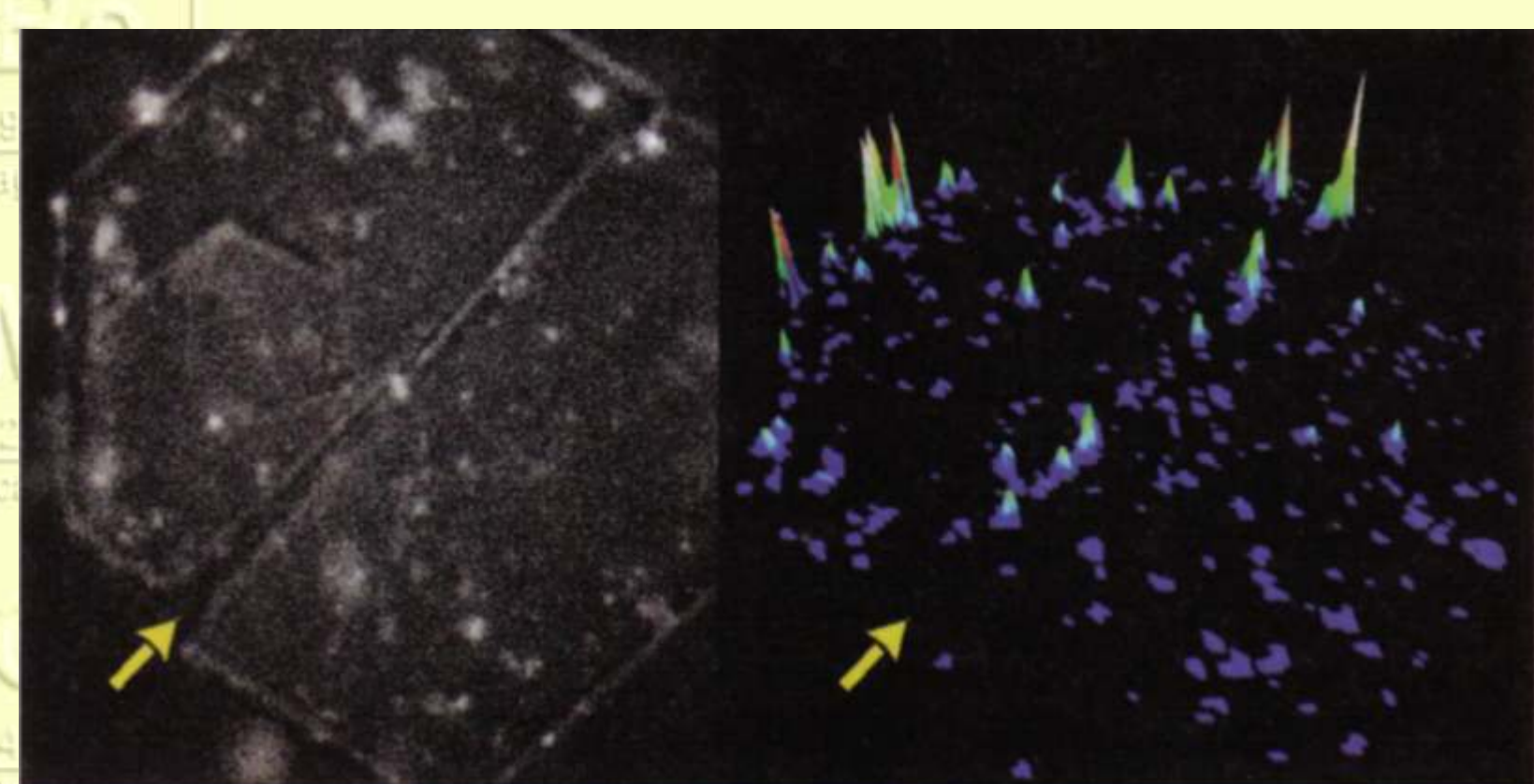


S'il·luminen els camins de reacció

Adding a new method to the list of single-molecule analytical techniques, researchers in Belgium have demonstrated that fluorescence microscopy can be used to monitor individual catalytic reactions that occur on the surfaces of solid catalysts submerged in reagent solution (M. B. J. Roeffaers *et al.*, *Nature* **2006**, 439, 572).

The technique, which was used to prepare still micrographs and microscopy videos, provides scientists with a new real-time and high-resolution method for probing molecular events that occur only on certain portions of catalyst surfaces. The work may broaden understanding of catalytic processes and lead to the design of new catalysts.

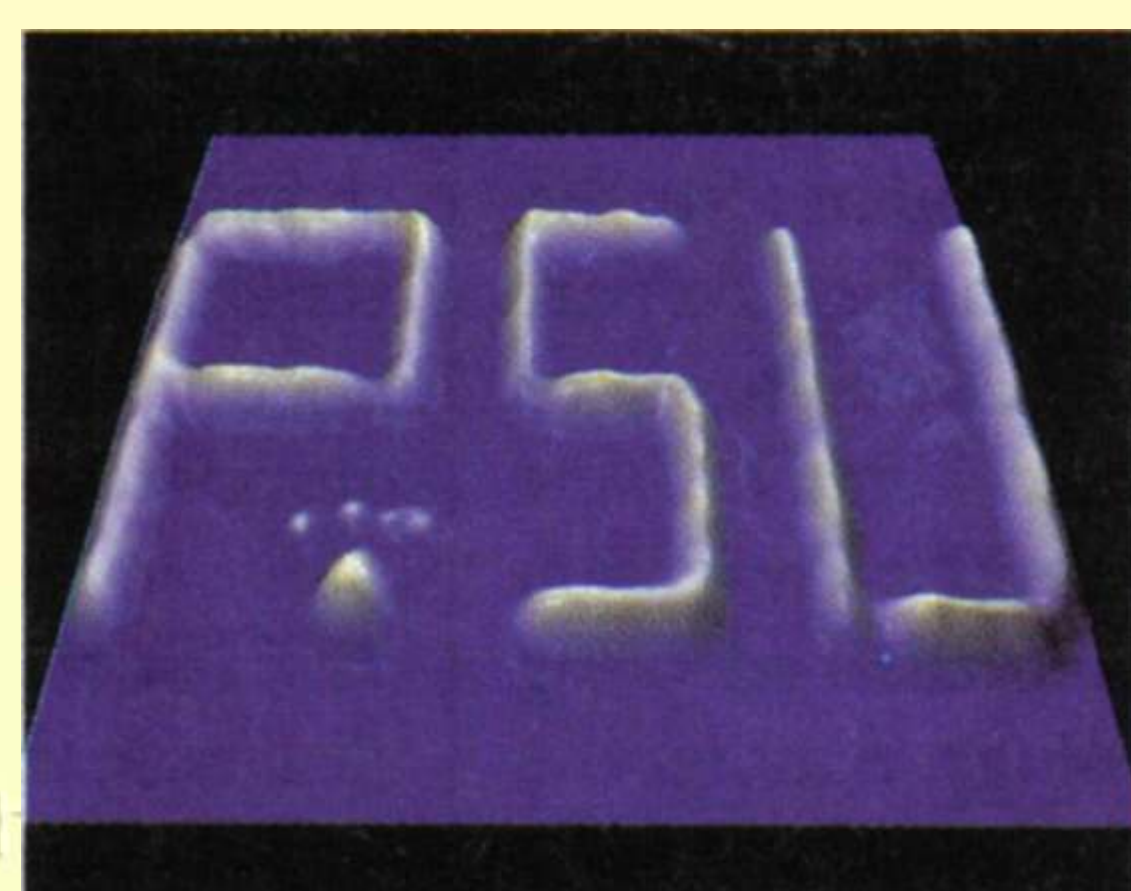
The new technique was applied to solution-phase reagents undergoing reactions on mineral-type catalysts. Specifically, the team used a specially configured microscope setup to probe the catalytic transformation of a nonfluorescent "reporter" compound (5-carboxyfluorescein diacetate, C-FDA) to a fluorescent product. The reactions were conducted by exposing reagent solutions to a lithium-aluminum gibbsite-type material known as a layered double-hydroxide catalyst.



Els àtoms ja es mouen per sota de les superfícies

Scientists at Pennsylvania State University have demonstrated a technique for imaging and manipulating hydrogen atoms just below the surface of a palladium crystal (*Proc. Natl. Acad. Sci. USA* **2005**, 102, 17907). Hydrogen interactions with precious metals are of key importance in hydrogen-storage applications, fuel cells, and other areas. In particular, subsurface H atoms have been fingered as intermediates in hydrogenation reactions on Pd, but until now the species has not been observed directly.

By treating a Pd crystal with hydrogen at elevated temperature and pressure, E. Charles H. Sykes, Paul S. Weiss, and coworkers prepare samples in which a small amount of H atoms are absorbed into the crystal's bulk. Then, by applying voltage pulses to select positions on the crystal surface with a scanning tunneling microscope tip, the team induces the atoms to accumulate at stable sites just below the top Pd layer, where they can form patterns of lines measuring just a few nanometers wide, as shown.

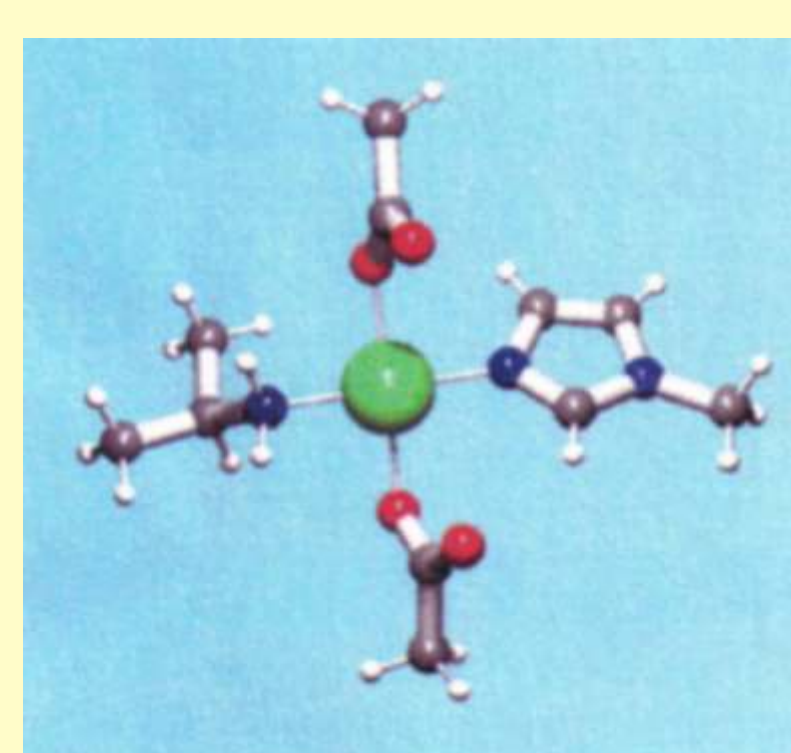


El trans-platí, competidor del cis-platí?

Platinum-containing drugs bind to DNA and interfere with the repair mechanism of cancer cells, ultimately causing cell death. However, the success of these drugs has been plagued by the serious side effects experienced by patients who can also develop a resistance towards them. This prompted Jan Reedijk and colleagues at the Universities in Leiden and Utrecht, the Netherlands, to develop trans platinum compounds in which the labile groups sit opposite each other. These differ from well-known platinum antitumour agents cisplatin and carboplatin in which the labile groups are on the same side of the complex (*Dalton Trans.* **2006**, 1020).

Ligands present on the platinum complex detach on binding to DNA. Acetate groups were chosen as leaving groups because the severe side effects of existing platinum drugs are thought to be triggered by the nature of the chloride leaving groups.

Reedijk's trans platinum compounds have been tested in cisplatin-resistant and cisplatin-sensitive cells and show promise as a new class of antitumour agents. The next stage in developing the platinum compounds as drug candidates is to prove that the biological activity is maintained in vivo.

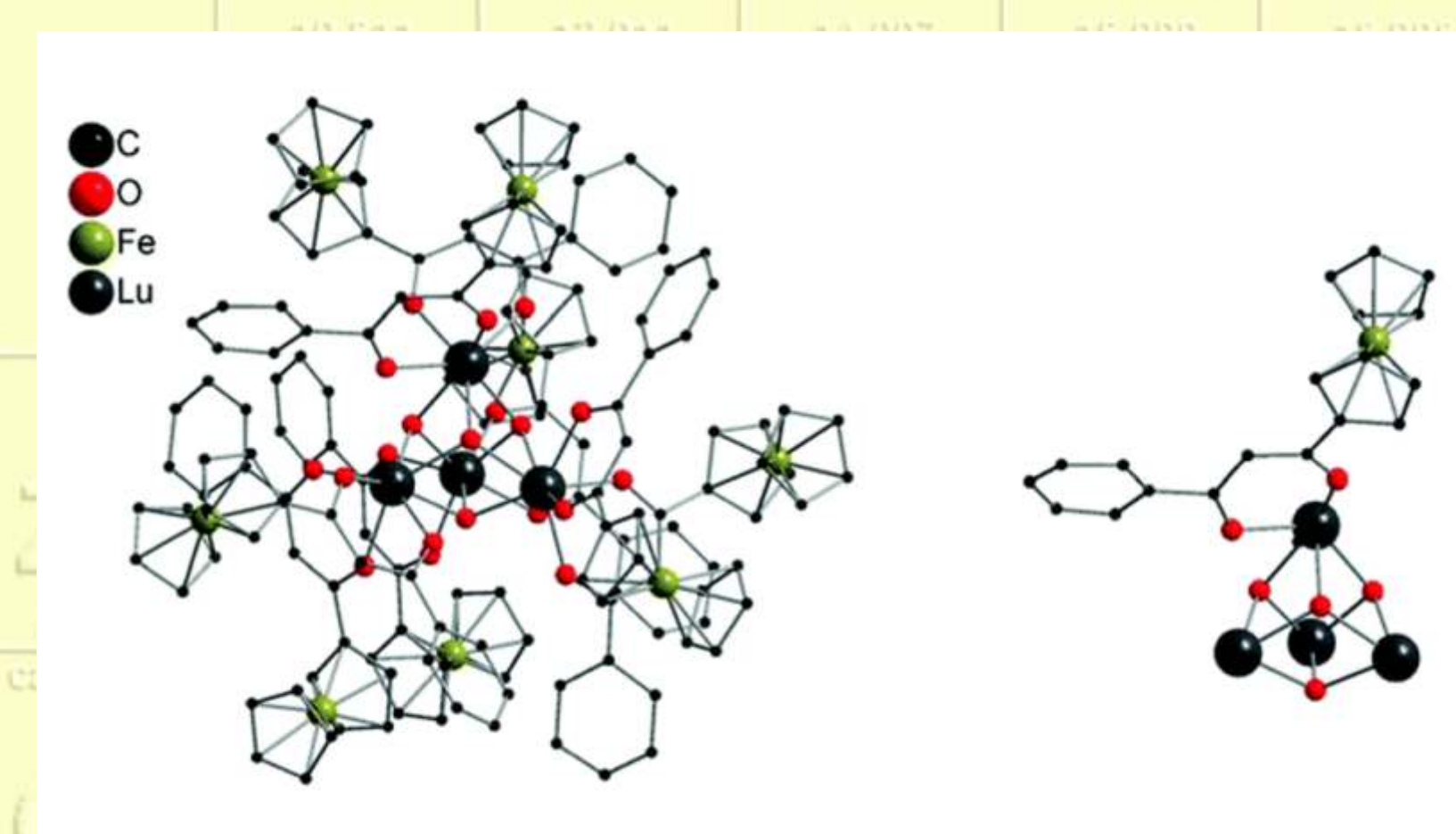


Cubans de luteci ancoren ferrocens

Viswanathan Baskar and Peter Roesky from the Freie Universität Berlin, Germany, have synthesised two molecular clusters containing eight ferrocene units and four centres based on lanthanide hydroxo groups (*Dalton Trans.* **2006**, 676). This is the maximum number of ferrocene units anchored to any metal-heteroatom framework reported to date. They are interested in the air-stable multiferrocene assemblies based on this lanthanide oxygen cluster core.

Applications of these compounds are found in the design of electron reservoirs, recognition of anionic species, as enzyme sensors and as models for fixation of multi-organometallic fragments on a metal oxide or carbide surface. Despite the potential of these molecular clusters, only a few main group and transition metal based clusters have been previously reported.

Roesky hopes this research will allow the synthesis of even larger assemblies and the production of single molecular magnets via insertion of paramagnetic metals, although he sees the development of a rational synthetic approach for such assemblies a challenge.

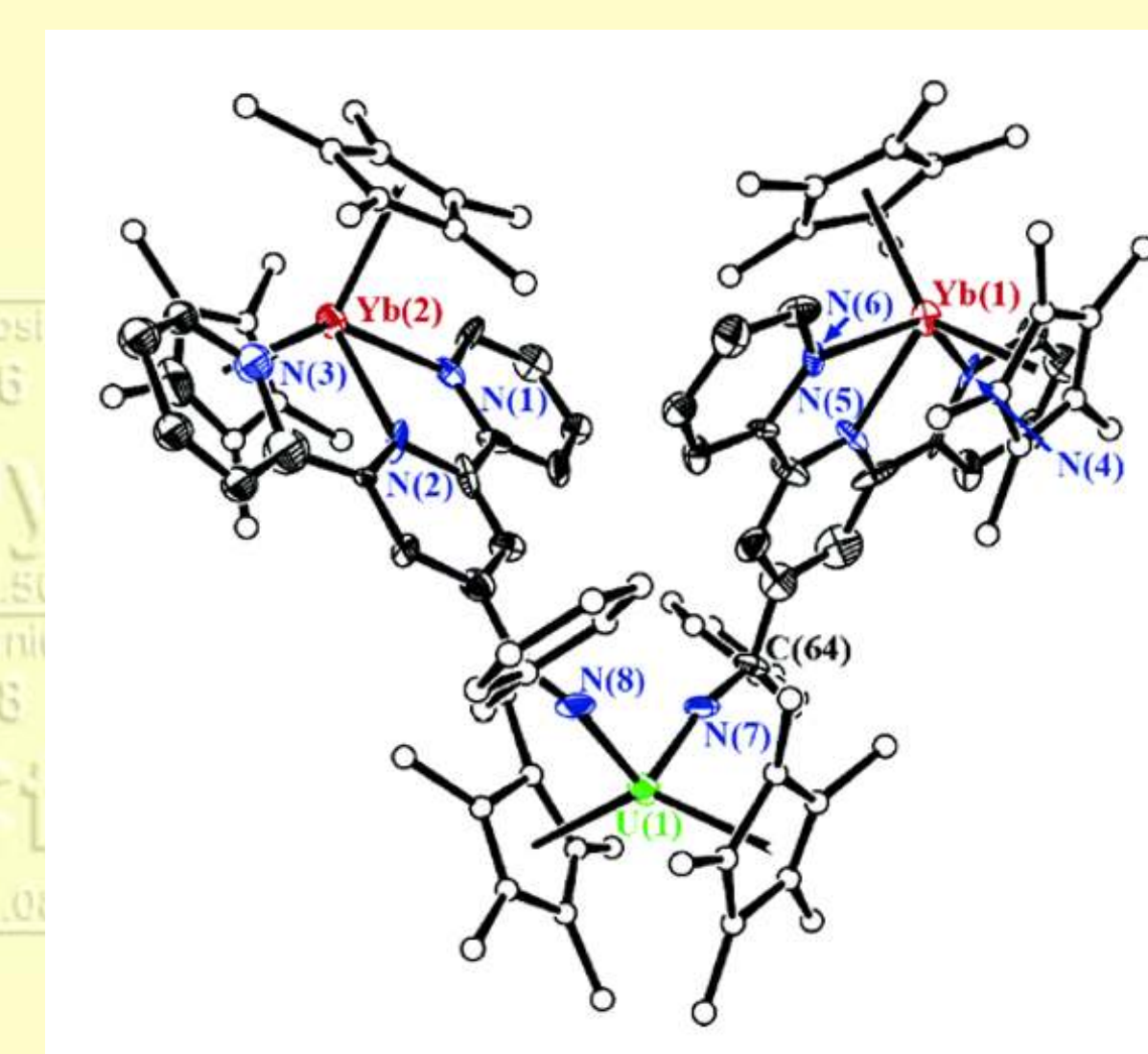


Lantànids i actínids, acoblats per primer cop

Bridging ligands between metal centers in organometallic complexes are known to serve as conduits for the metal atoms to engage in d-d, d-f, and, in rare cases, f-f electron coupling, giving rise to potentially useful electronic and magnetic properties.

Eric J. Schelter, and coworkers at Los Alamos National Laboratory have now demonstrated examples of the first f-f electron coupling for lanthanide-actinide complexes (*J. Am. Chem. Soc.*, **2006**, 128, 2198). The team synthesized the complexes by coupling thorium or uranium ketimide-terpyridine complexes to an ytterbocene complex.

The uranium complex shown is one of only three known structurally characterized complexes containing both lanthanide (Yb = red) and actinide (U = green) metal ions; the ketimide ligands bound to uranium (U-N=CR-, R = benzyl) connect to the terpyridine ligand bound to each ytterbium atom (N = blue, C = gray). The "rich electrochemical behavior" of the complexes indicates that the 4f and 5f metals are electronically communicating, and the magnetic response of the uranium complex indicates U-Yb magnetic coupling at low temperatures, the researchers report.



Breus

- Ha sortit la tercera edició del Llibre Vermell: *Nomenclature of Inorganic Chemistry. IUPAC Recommendations 2005*.
- Investigadors de la Universitat de Barcelona han desenvolupat un nou procediment per detectar bitllets d'euro falsos basats en l'anàlisi mitjançant l'espectroscopia d'infraroig (<http://www.rsc.org/chemistryworld/News/2006/January/23010601.asp>).
- Les partícules metàl·liques de platí, pal·ladi, rodi i osmi provinents dels catalitzadors dels cotxes comencen a ser un problema mediambiental [S. Rauch *et al.*, *Environ. Sci. Technol.*, **2005**, 39, 9464].
- La base de dades *Crossfire*, que conté la informació del Gmelin i el Beilstein, ha estat ampliada i actualitzada. Ara es comercialitza amb el nom de *Discovery Gate*.

L'element número 26, ferro, es coneix des de l'antiguitat; hi ha evidències que indiquen que es feia servir fa més de 7000 anys. Ja se'n parla a la Bíblia i apareix a escrits de totes les civilitzacions antigues.