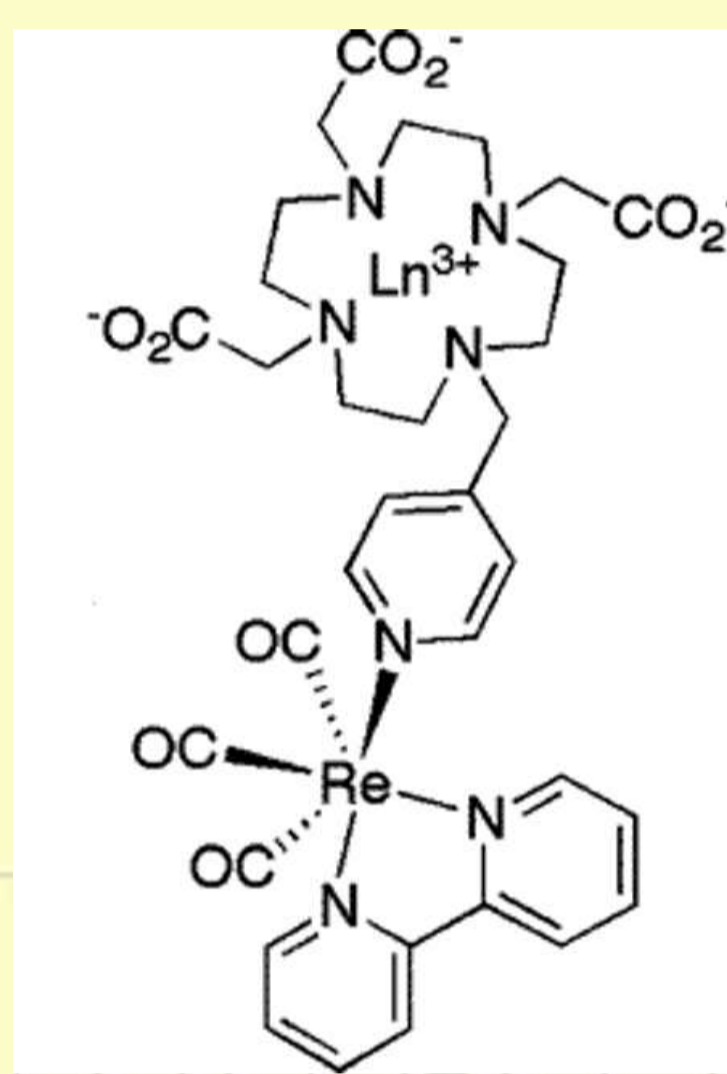


## Agents de contrast: 2 en 1

A novel bimetallic complex could be used as a contrast agent for both luminescence microscopy and magnetic resonance imaging (MRI), two powerful biological imaging methods that usually require different imaging agents. Stephen Faulkner of the University of Manchester, in England, and coworkers describe the spectroscopic properties of the potential imaging agent (shown), which contains a luminescent rhenium chromophore in combination with a gadolinium macrocycle that is typically used as an MRI contrast agent (*J. Am. Chem. Soc.*, **2008**, *130*, 2178).

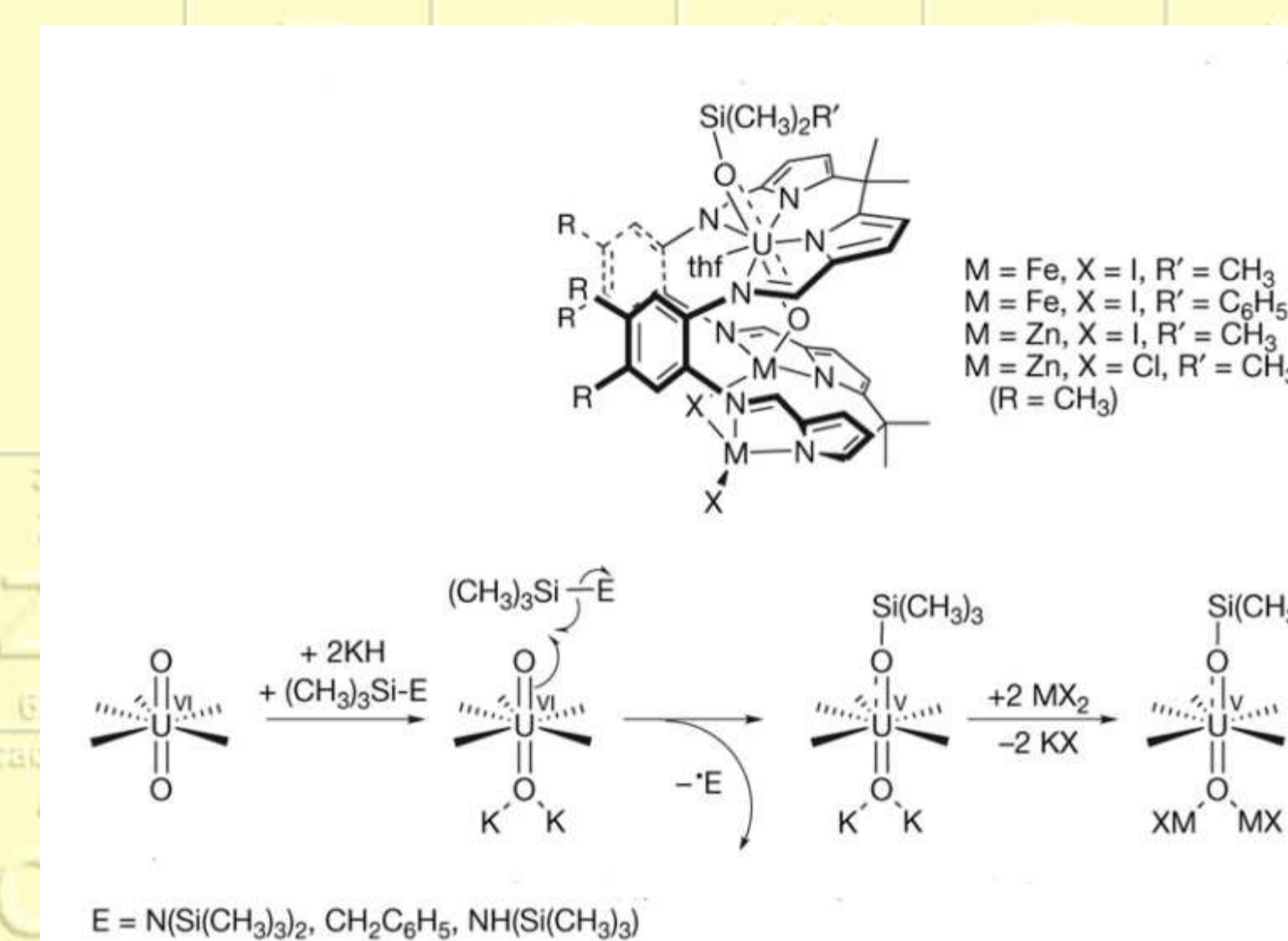
The luminescence lifetime of the molecule lasts long enough to overcome any short-lived background fluorescence, and the molecule's luminescence response is linear over a broad concentration range, from subnanomolar to 100  $\mu\text{M}$ . But the MRI contrast of the bimetallic complex is likely to be poor at submicromolar concentrations, the researchers note. They hope to develop additional complexes that can provide MRI contrast at nanomolar concentrations, possibly by adding more gadolinium ions.



## L'entorn activa l'uranil

The frustratingly unreactive oxygen atoms in the water-soluble uranyl ion,  $\text{UO}_2^{2+}$ , have now been shown to be capable of powerful chemistry—in the right environment. Inorganic chemist Polly L. Arnold (Scotland's University of Edinburgh) and colleagues show that when  $\text{UO}_2^{2+}$  is enmeshed within an inflexible jaw-shaped ligand, the ion's electronic structure is altered sufficiently to make its normally inert oxygens reactive enough to cleave Si-N and Si-C bonds (*Nature* **2008**, *451*, 315).

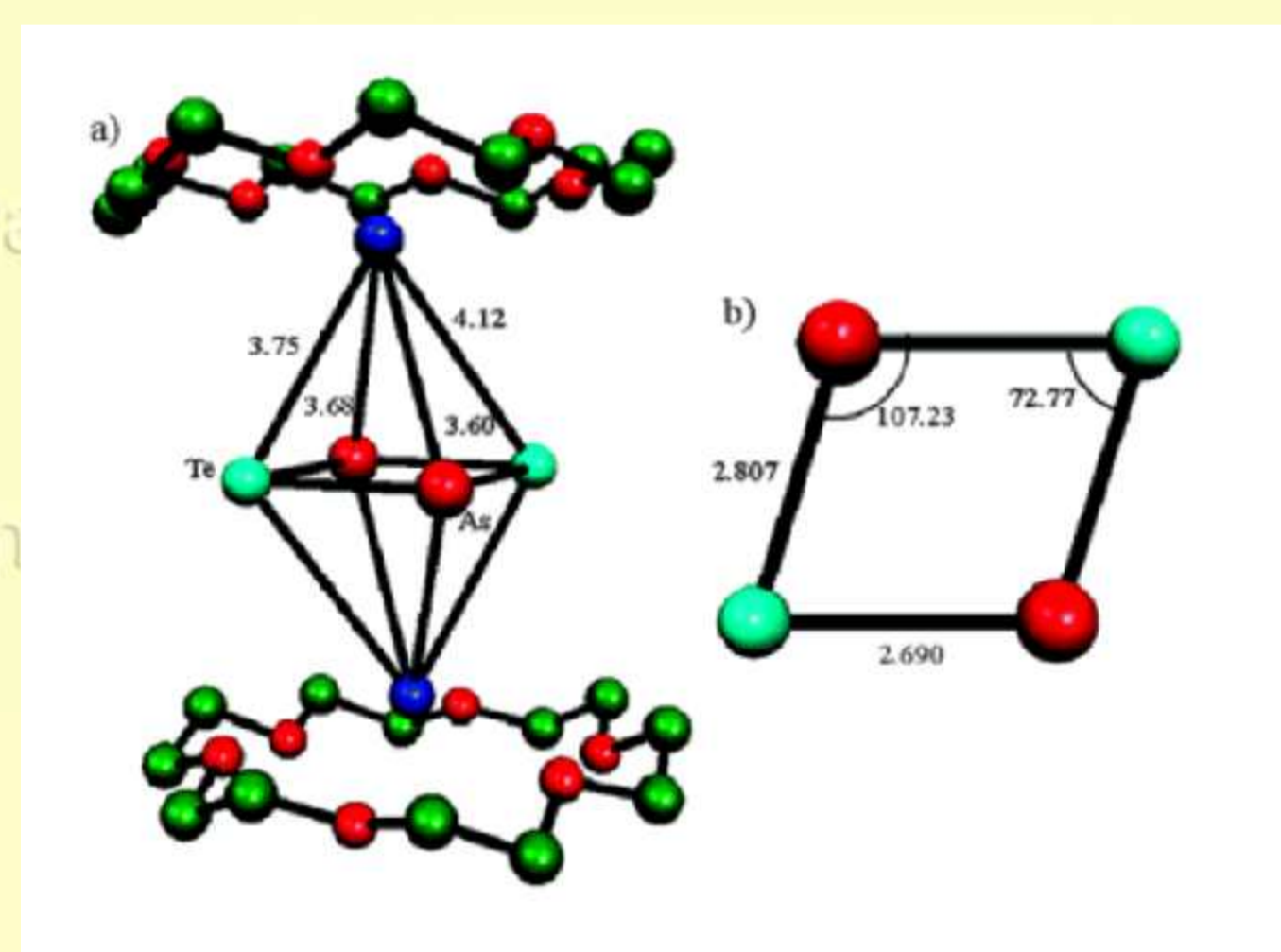
The discovery has potential for helping to solve problems of pervasive uranium contamination around nuclear power plants and might be generalized to include the uranyl ion's cousins, the radioactive plutonyl and neptunyl ions.



## Aromaticitat inorgànica: $[\text{Te}_2\text{As}_2]^{2-}$

Aromaticity and antiaromaticity, once purely the domain of organic chemistry, has expanded in recent years to include organometallic complexes, all-metal clusters, and main-group compounds. In a new example, Angel Ugrinov (Pennsylvania State University) and coworkers report the synthesis and crystal structure of  $[\text{Te}_2\text{As}_2]^{2-}$ , the first four-membered ring anion made from a combination of group 15 and 16 elements (*J. Am. Chem. Soc.* **2008**, *130*, 782).

The planar anion, sandwiched between two potassium 18-crown-6 units (shown), has alternating Te-As bond lengths and angles that give it a parallelogram geometry. The structure and molecular orbital analysis reveal a quite unusual electronic structure for the anion: d-antiaromatic bonding coupled with p-aromatic bonding and a triplet electronic ground state, which leads to the distorted square shape and net aromatic character. While similar systems with this "conflicting aromaticity" have previously been observed in the gas phase,  $[\text{Te}_2\text{As}_2]^{2-}$  is the first example isolated as a solid.



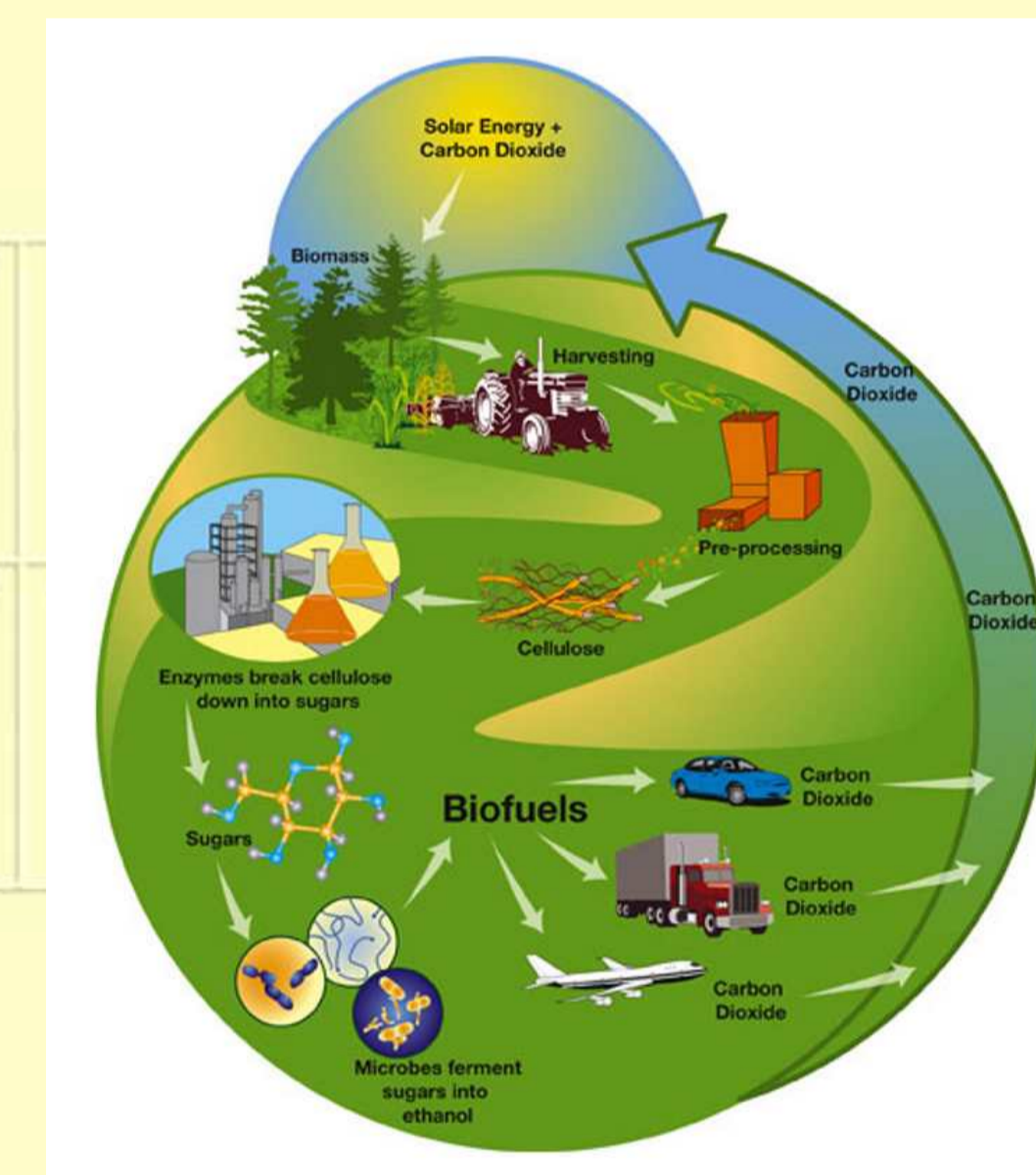
## Són els biocombustibles innocents?

The use of biofuels could sharply increase greenhouse-gas emissions by driving the conversion of native land to agriculture, according to research published online last week in *Science*.

Timothy Searchinger from Princeton University in New Jersey and his colleagues suggest that it takes 167 years for the emissions reductions gained by burning corn ethanol to make up for the sharp spike in emissions caused by clearing new land for farms (*Science* **2008**, *319*, 1238).

And a second study, led by Joseph Fargione of the Nature Conservancy in Minneapolis, Minnesota, calculates that the time needed to clear this 'carbon debt' would vary from 17 to 420 years, depending on the circumstances. (*Science* **2008**, *319*, 1235).

But biofuels made from waste biomass, or perennial crops grown on abandoned agricultural lands, offer "immediate and sustained greenhouse-gas advantages", according to Fargione's team.



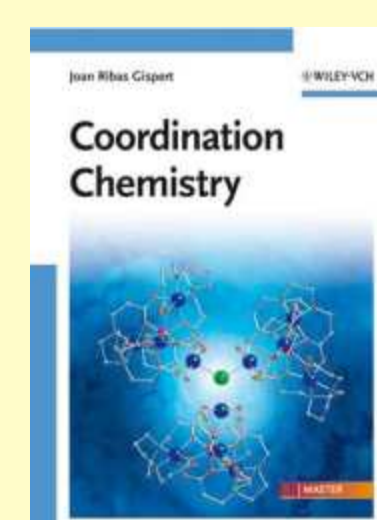
## Breus



- Investigadors de la companyia Nestlé han desenvolupat una màquina que pot reproduir les avaluacions sensorials dels tastadors de cafè professionals. Es basa en l'espectrometria de masses amb reacció de transferència de protons (PTR-MS) (C. Lindinger *et al.*, *Anal. Chim.* **2008**, *80*, 1574).



- S'estan fent grans inversions per construir plantes que facin servir el carbó en comptes del petroli com a matèria primera en la fabricació de compostos químics. Els principals interessats són els Estats Units i la Xina (*Chem. Eng. News*, 17 març 2008, p. 150).



- L'editorial Wiley-VCH ha publicat el llibre *Coordination Chemistry*, del Professor del Departament Joan Ribas Gispert.

## Avui recomanem



L'exposició *L'ordre dels elements abans i després de Mendeleiev*, preparada per la Biblioteca de Física i Química, es pot visitar a Internet. És possible també adquirir el pòster que mostra la cronologia de les principals aportacions a l'ordenació dels elements químics.

<http://www.bib.ub.edu/evirtuals/mendeleiev/1024.html>

## L'element



L'element número 38, estronci, fou descobert per Adair Crawford l'any 1790 en unes mines de plom situades en el poble escocès *Strontian* (*Srón an t-Sithein* en gaèlic). Fou aïllat per Davy l'any 1808.

Les sals s'utilitzen per donar el color carmí en els focs artificials. L'isòtop  $^{90}\text{Sr}$  és radioactiu, amb una vida mitjana de 29,1 anys, i es produeix en les explosions nuclears. Quan s'inhala es processa com el calci i s'incorpora als ossos produint càncer d'ossos i leucèmia.