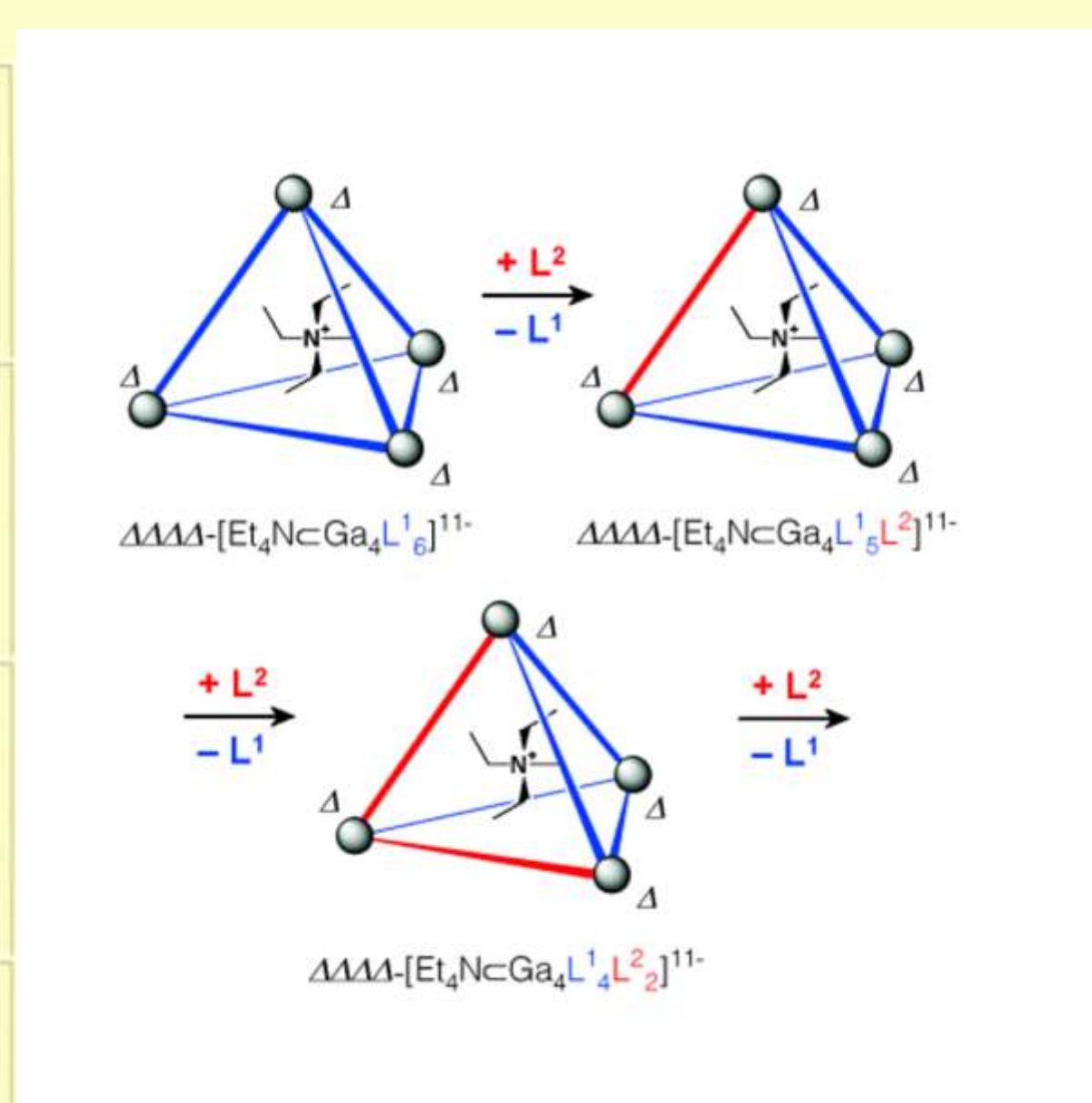


## Tetràedres de gal·li amb memòria quiral

An entire building can be rebuilt by removing a single board at a time and replacing it with a new one. Chemists have now shown that a novel supramolecular assembly has this same "structural memory," but with a couple of intriguing twists: The replacement molecular "boards" can differ from the originals without affecting the structure.

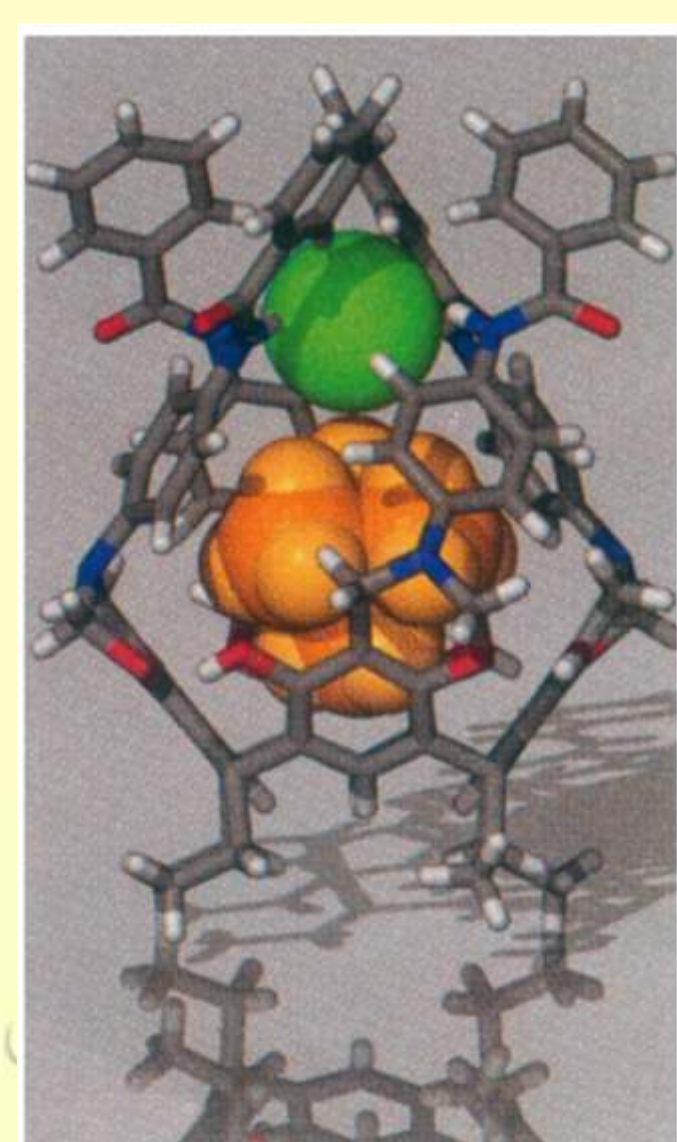
While the structure's ligands are achiral, the system retains its original chirality, even after a ligand is replaced. University of California, Berkeley, chemistry professor Kenneth N. Raymond and coworkers discovered this property in their chiral tetrahedral structure, in which six bis-catecholate ligand edges span four gallium(III) vertices [*Angew. Chem. Int. Ed.* **42**, 665 (2003)]. The structure acts as a nanoscale flask, inside which guest molecules can react.



## Un parell d'ions segregat

A new approach to anion recognition that uses electrostatic and hydrogen-bonding interactions has been developed. The authors embedded a tetramethylammonium cation (golden spheres) in the pocket of a resorcin[4]arene molecule functionalized with bulky amide substituents. The complex selectively binds to a chloride anion (green sphere) in solvents such as methanol [J.L. Atwood and A. Szumna, *Chem. Comm.*, **2003**, 940].

The molecular host capsules are robust. The cation binds to the interior of the capsule by C-H ... interactions with eight surrounding aromatic rings. Though not covalently bound, it remains remarkably stable over a variety of conditions. The guest chloride anion is bound by hydrogen bonding to the hydrogen atoms of the host molecule's amide groups.



## Química prebiòtica: el naixement de l'amoniac

Günter Kreisel and Wolfgang Weigand at the University of Jena, in Germany, and coworkers have developed a lab method to prepare NH<sub>3</sub> from N<sub>2</sub> under conditions that they believe could have existed during the prebiotic era [*Angew. Chem. Int. Ed.*, **42**, 1540 (2003)]. They use inorganic FeS as a substitute for the nitrogenase enzyme, made up of an FeS-based protein and an MoFeS-based protein, that bacteria use for the transformation. Ammonia is produced in water at 70–80 °C and atmospheric pressure.

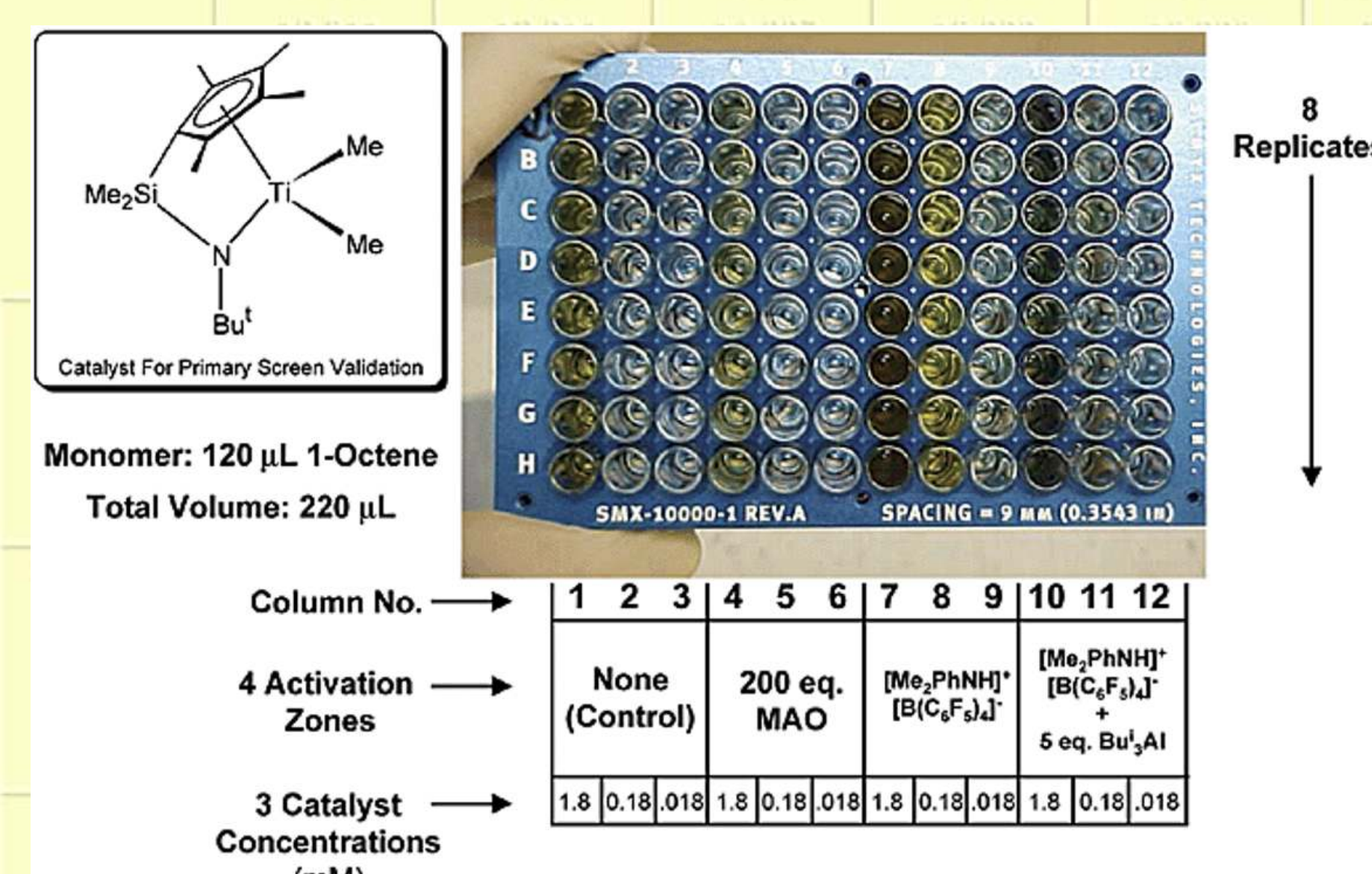
N<sub>2</sub> adsorbs on the surface of the FeS particles and is subsequently attacked by hydrogen ions. One of the key observations of the experiments is that freshly prepared FeS is required: When the research team tried commercial or previously prepared FeS, NH<sub>3</sub> didn't form. Upon microscopic investigation, the researchers discovered that the freshly precipitated FeS has a very rugged surface compared with older material, and they believe it must contain Fe–S structures that allow N<sub>2</sub> binding.



## La química combinatorial catalitza el descobriment de nous catalitzadors

A new class of single-site catalysts for olefin polymerization has been discovered. The new amide-ether-based hafnium catalysts were found using a fully integrated high-throughput screening methodology [V. Murphy and col. *J. Am. Chem. Soc.*, **125**, 4306 (2003)]. The new screening methodology enabled them to do in days or weeks what used to take many months or years.

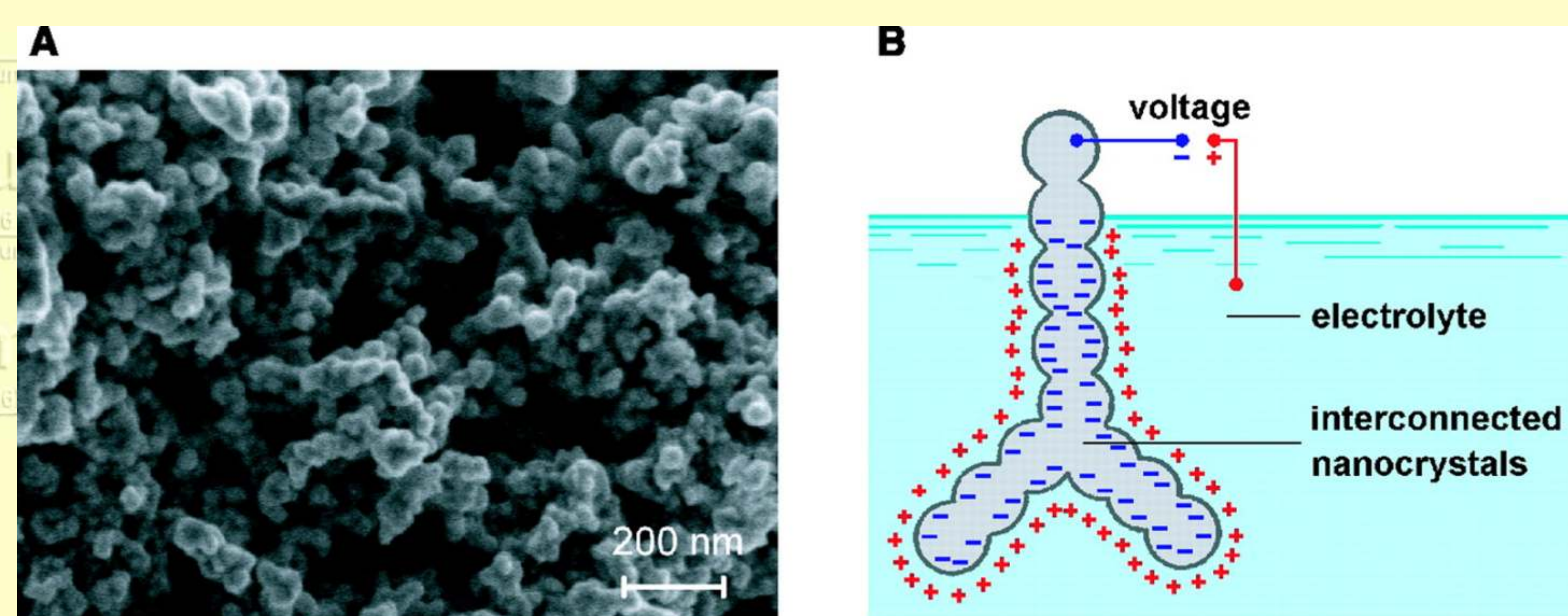
The researchers set out to discover new catalysts with potential for the production of linear low-density polyethylene, which is a copolymer of ethylene and an  $\alpha$ -olefin, such as 1-octene. They first synthesized a library of hafnium and zirconium complexes containing 23 different bidentate and tridentate ligands. To screen these complexes under different activation conditions, they carried out 384 polymerization experiments in just a few hours.



## Les nanopartícules treballen

Nanostructured materials join the list of materials that can reversibly change their dimensions enough to have potentially useful applications. Jörg Weissmüller and Herbert Gleiter at the Institute for Nanotechnology, Karlsruhe, and coworkers find that passing an electrical current through pressure-compacted platinum nanoparticles produces changes in the particles' dimensions that are large enough to do mechanical work [*Science*, **300**, 312 (2003)].

The reversible change, known as actuator strain, is about 0.1% for the nanoparticles. This is in the same range as the best results seen for commercial ferroelectric ceramics or carbon nanotube bundles, both of which are under study for uses like remote sensing, cantilevers that open or close engine valves, or artificial muscles in robots. The induced strain is proportional to the particles' surface-to-volume ratio, and since porous metals with higher ratios are known, the researchers believe their initial results can be improved. But many factors yet to be explored will determine whether nanoporous metals can be competitive with other materials in actuator devices, they note.



## Breus

- Les memòries del neuròleg Oliver Sacks (Londres, 1933) *El tío Tungsteno* (Anagrama, Barcelona 2003) són, de fet, una història de la Química amena i estimulant.
- S'ha proposat el nom de *Darmstadtii* (Ds) per a l'element 110, en reconeixement de la ciutat alemanya on ha estat preparat.
- Els manuscrits d'Einstein es poden trobar a Internet: <http://alberteinstein.info>
- El compost Al<sub>2</sub>H<sub>6</sub>, anàleg del diborà, ha estat detectat per espectroscòpia infraroja [L. Andrews and X. Wang; *Science*, **299**, 2049 (2003)].

L'element número 10, **neó**, va ser descobert l'any 1896 per W. Ramsay i M. Travers. El seu nom prové de la paraula grega *neōs*, que vol dir *nou*.