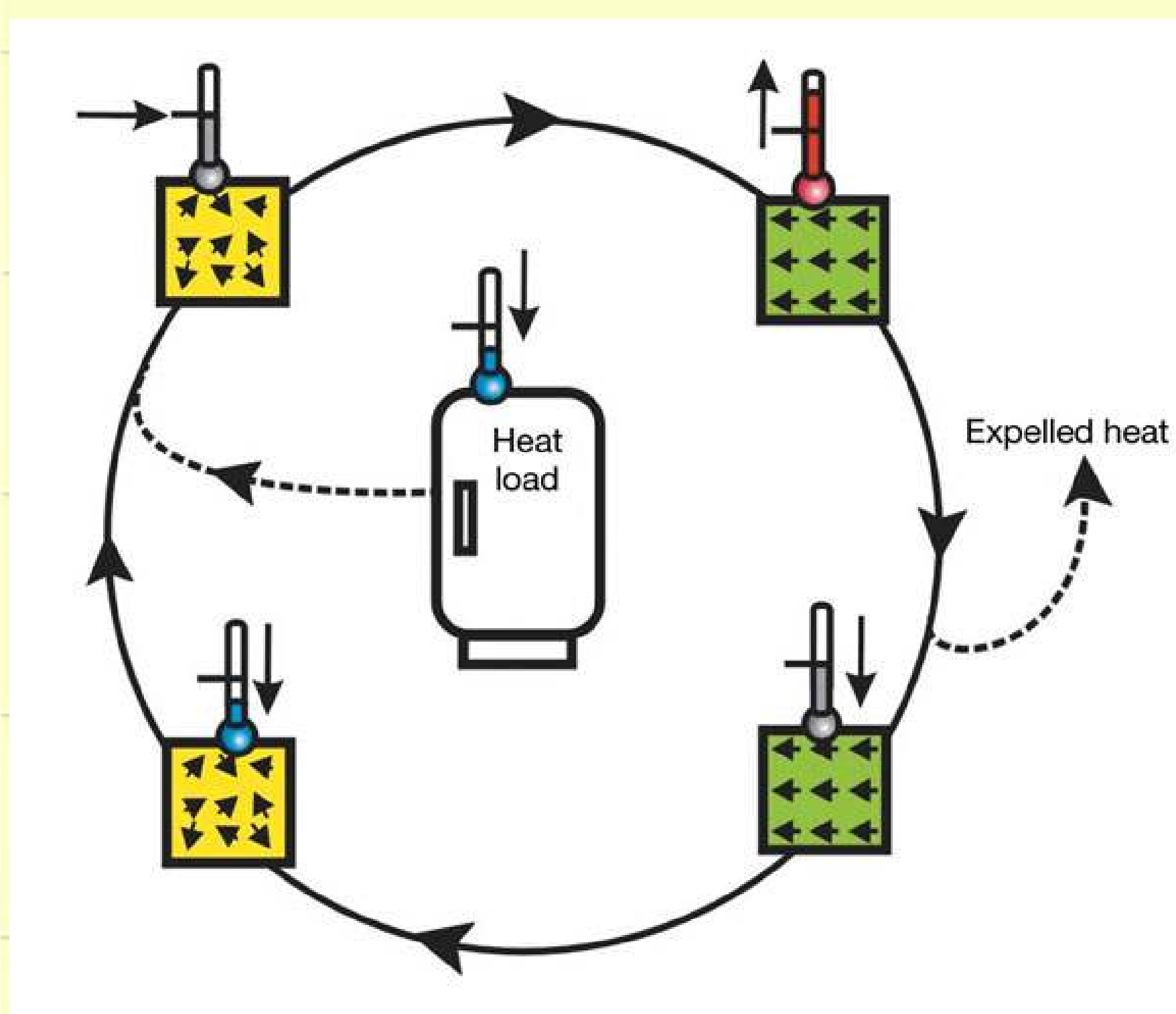


Refrigeració i magnetisme

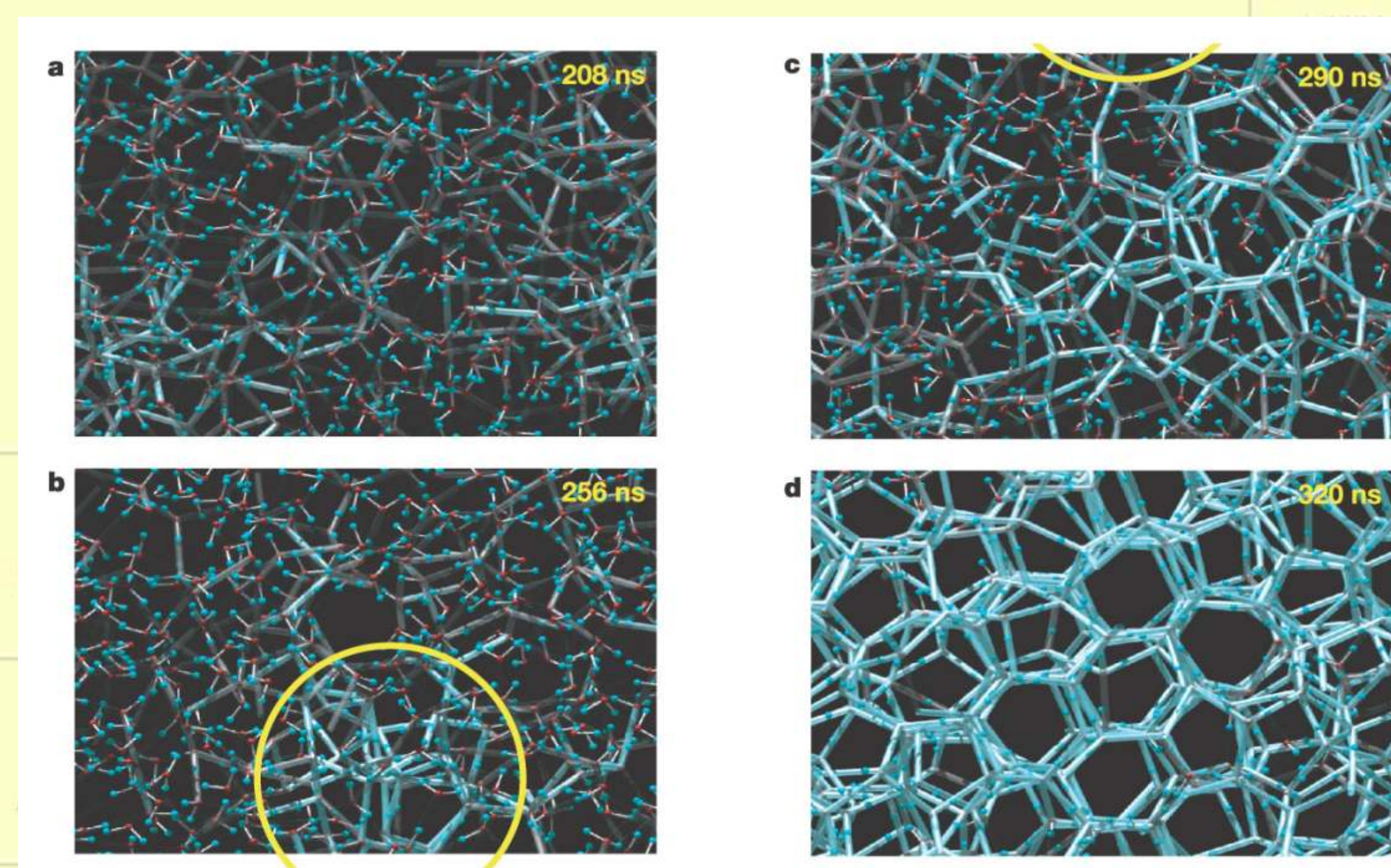
Magnetic refrigeration techniques based on the magnetocaloric effect (MCE) have recently been demonstrated as a promising alternative to conventional vapour-cycle refrigeration. In a material displaying the MCE, the alignment of randomly oriented magnetic moments by an external magnetic field results in heating. This heat can then be removed from the MCE material to the ambient atmosphere by heat transfer. If the magnetic field is subsequently turned off, the magnetic moments randomize again, which leads to cooling of the material below the ambient temperature. E. Brück and coworkers (Universiteit van Amsterdam) report the discovery of a large magnetic entropy change in $\text{MnFeP}_{0.45}\text{As}_{0.55}$, a material that has a Curie temperature of about 300 K and which allows magnetic refrigeration at room temperature [*Nature*, **415**, 150 (2002)].



La congelació de l'aigua, simulada

After six years of supercomputer time, Iwao Ohmine and coworkers (Nagoya University) have simulated the freezing of water at ambient conditions, capturing at the molecular level what occurs during the process [*Nature*, **416**, 409 (2002)].

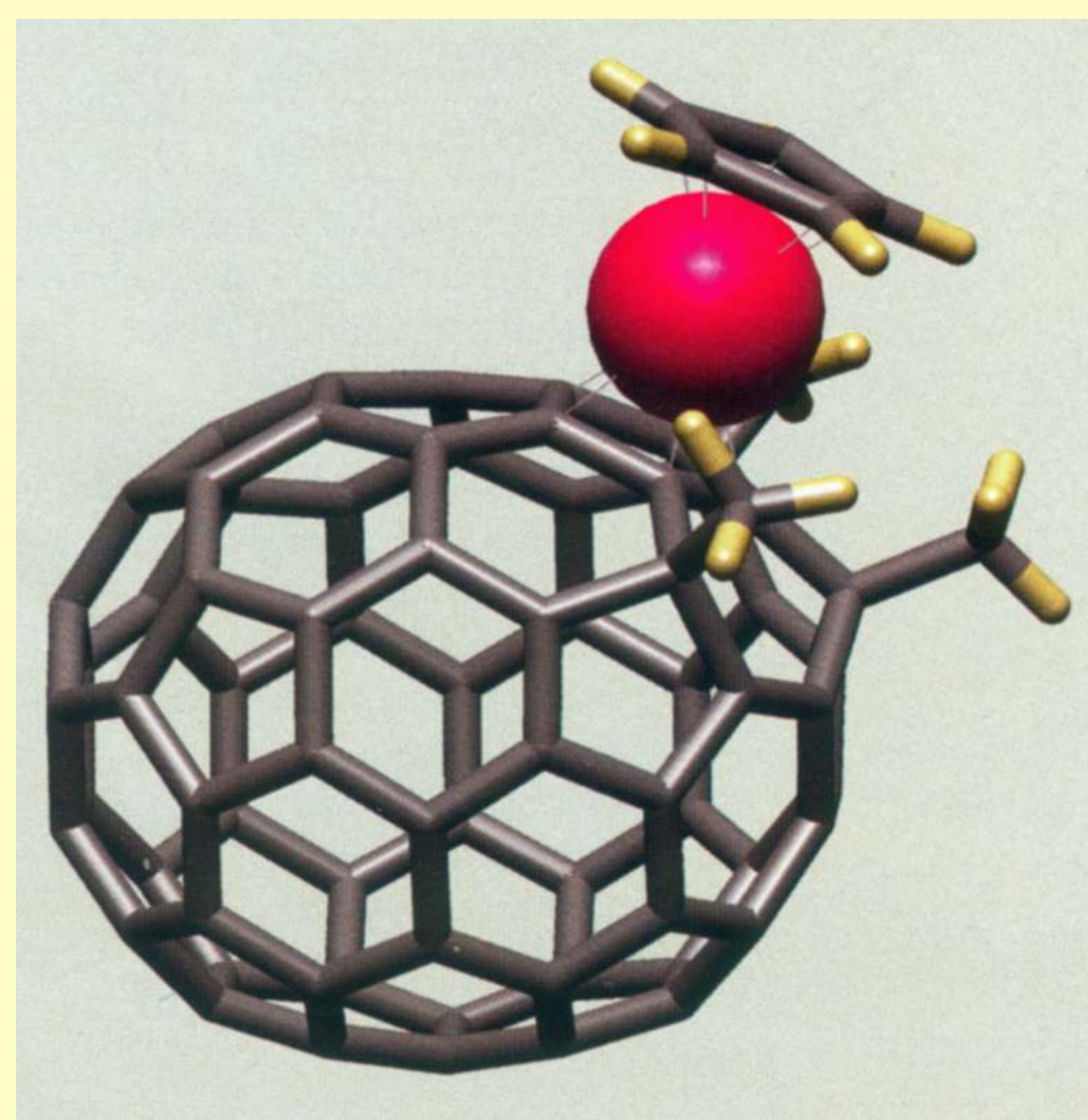
In the quiescent period (0–256 nanoseconds), water molecules are in a supercooled liquid state. Hydrogen-bonded networks are broken and formed continuously, much like in ordinary liquid water. Freezing begins at the next stage (256–290 ns). A polyhedral structure made of long-lasting hydrogen bonds then forms spontaneously, becoming the initial crystal nucleus. In the third stage (290–320 ns), the nucleus expands quickly, transforming the hydrogen-bonded networks into six-membered rings. Finally (>320 ns), the hydrogen-bonded networks stack like a honeycomb. Ice is formed.



Font: *Chem. Eng. News*, 1 abril 2002, 13

Ferrocè i ful·lerè, enllaçats

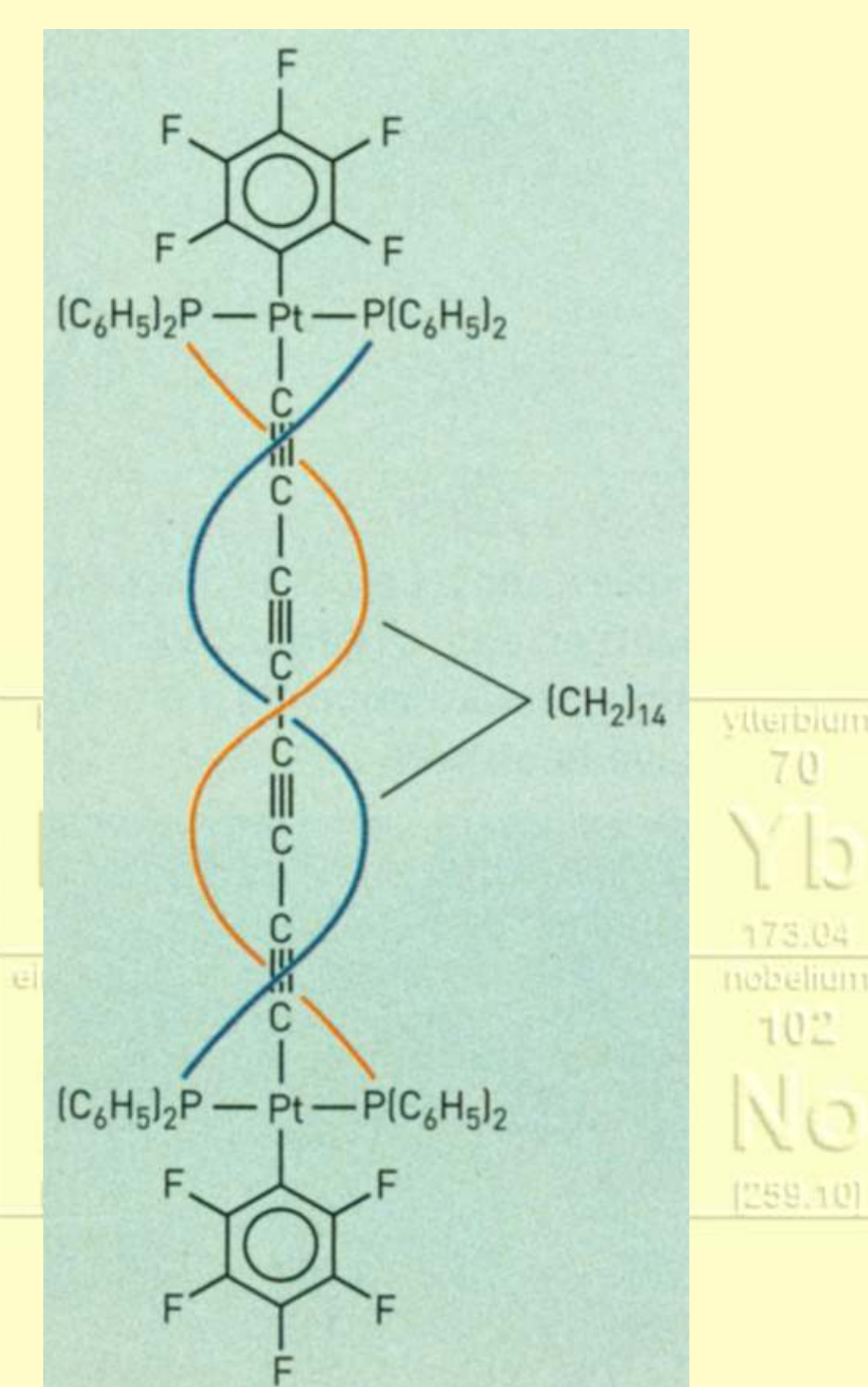
Eiichi Nakamura and coworkers (University of Tokyo) describe the synthesis, on a multigram scale, of the first two "bucky ferrocenes" [*J. Am. Chem. Soc.*, **124**, 9354 (2002)]. In both, an iron(II) atom is sandwiched between a discrete cyclopentadienyl (Cp) ring and a cyclopentadienide ring that is part of a C_{60} or C_{70} cage.



Font: *Chem. Eng. News*, 5 agost 2002, 8

Doble hèlix organometàl·lica

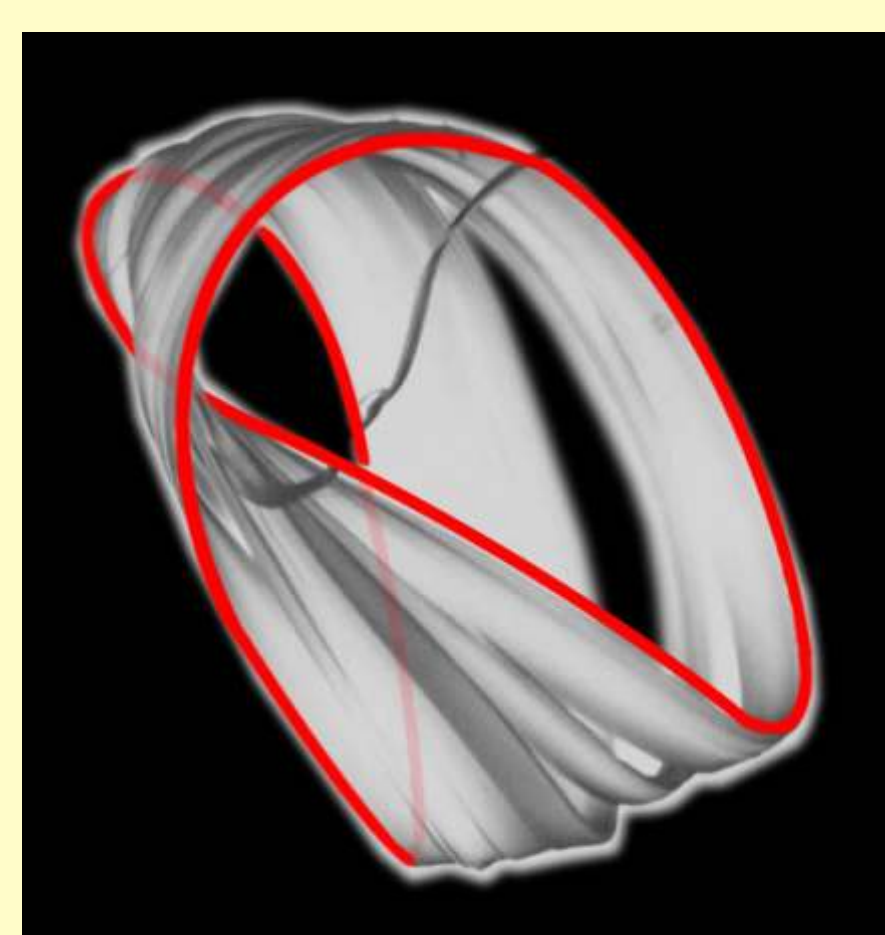
A new class of double-helical molecules has been synthesized. The molecules consist of two platinum atoms bridged by a rodlike chain of carbon atoms--along which electrons and charge can flow--surrounded by diphosphine ligands bearing flexible carbon double helices that insulate the rods [*J. A. Gladysz and coworkers, University of Erlangen-Nuremberg and University of Utah; Angew. Chem. Int. Ed.*, **41**, 1871 (2002)].



Font: *Chem. Eng. News*, 3 juny 2002, 7

Cinta de Möbius inorgànica

Under certain growth conditions, crystalline ribbons can adopt the one-sided topology of a Möbius strip, with one end twisted 180° and then joined to the other [*Nature*, **417**, 397 (2002)]. Satoshi Tanda (Hokkaido University) and coworkers were surprised to observe the Möbius structure shown after growing single crystals of NbSe_3 under novel conditions. The researchers are investigating how these topologies affect the material's electronic properties.



Font: *Chem. Eng. News*, 4 març 2002, 35

Breus

- Xina guanya la XXXIV Olimpíada Internacional de Química (*Chem. Eng. News*, juliol de 2001, pàgina 10).
- En la indústria química nord-americana, només el 7 % dels executius són dones.
- El Grup d'Estructura Electrònica d'aquest Departament, dirigit pel Dr. Santiago Alvarez, encapçala el rànquing d'ús dels supercomputadors de Catalunya (CESCA-CEPBA).
- La pàgina web <http://www.ch.cam.ac.uk/c2k> conté la recopilació dels 2000 millors setis de química a Internet.

L'element número 5, **bor**, va ser descobert l'any 1808 per H. Davy, J. L. Gay-Lussac i L. J. Thennard. El seu nom prové del mot àrab *buraq*, que designa el mineral bòrax, $\text{Na}_2[\text{B}_4\text{O}_5(\text{OH})_4] \cdot 8 \text{H}_2\text{O}$.