UNIVERSITAT DE BARCELONA

Departament de Química Inorgànica

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Notícies Inorgàniques

Any 1, Núm. 6, Novembre de 2002

El petroli té un origen inorgànic!

J. F. Kenney of Gas Resources Corp., Houston, and the Joint Institute of Earth Physics, Moscow, Russia, and colleagues have predicted the thermodynamic conditions under which the hydrocarbons found in crude oil form and tested those conditions in the lab [*Proc. Natl. Acad. Sci. USA*, **99**, 10976 (2002)]. Kenney and coworkers reacted iron oxide, marble ($CaCO_3$), and water at conditions reaching 1,500 ºC and 50,000 atm. Hydrocarbons ranging from methane to decane were formed in proportions that mirror naturally occurring petroleum.

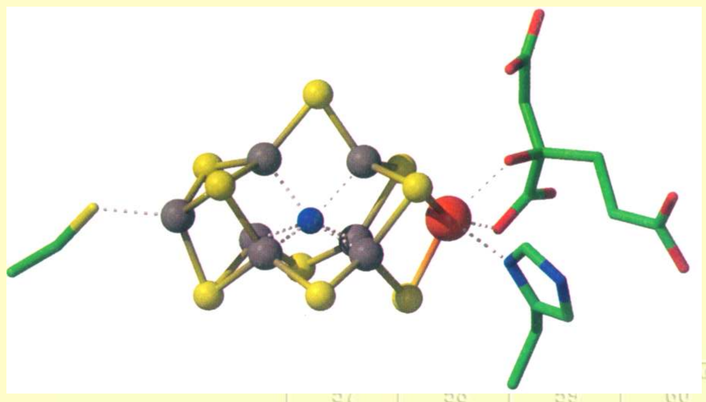
Taken together, the theoretical and experimental results make the biogenic theory untenable, the researchers conclude.

Font: *Chem. Eng. News*, 26 agost 2002, 30

L'àtom perdut de la nitrogenasa

High-resolution crystal structure of the MoFe protein of nitrogenase, which contains the iron-molybdenum cofactor that converts N_2 to NH_3, reveals a previously overlooked atom (blue sphere) centered in a cage of six iron atoms (gray).

From the magnitude of observed electron density in the 1.16-Å-resolution structure, the central atom could be carbon, oxygen, or nitrogen, but nitrogenase's enzymatic activity makes nitrogen most plausible [D.C. Rees, J.B. Howard and coworkers, California Institute of Technology and University of Minnesota; *Science*, **297**, 1696 (2002)].



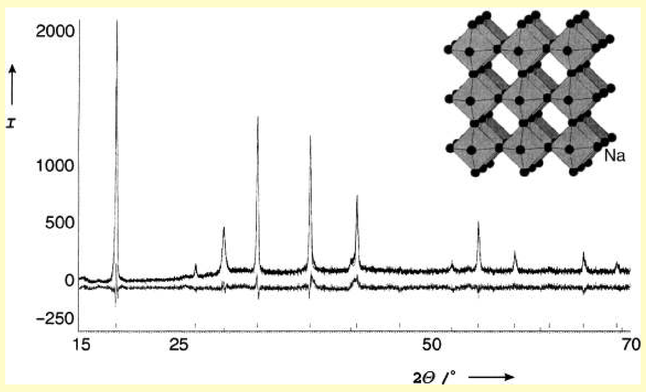
Font: *Chem. Eng. News*, 9 setembre 2002, 9

El Na_3N, preparat per fi

Sodium nitride, a compound that some scientists claimed could not exist, has been prepared by D. Fisher and M. Jansen, at the Max Planck Institute for Solid-State Research, Stuttgart, Germany.

Amorphous solid Na_3N was prepared by generating atomic beams of sodium and nitrogen separately in a vacuum chamber and codepositing the atoms onto a liquid-nitrogen-cooled sapphire substrate [*Angew. Chem. Int. Ed.*, **41**, 1755 (2002)].

The Na_3N changes to crystalline form when heated to room temperature and decomposes into its elements at 87 ºC. The compound has a lattice structure of the type known as anti-ReO_3, in which octahedra are connected at all six corners to adjacent octahedra to form a three-dimensional network. Six sodium cations are located at the corners and one nitrogen atom is in the center of each octahedron.

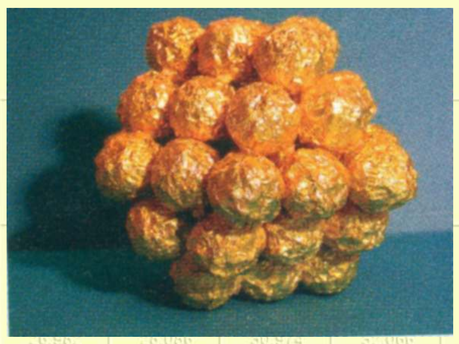


Font: *Chem. Eng. News*, 20 maig 2002, 9

El clúster Au_{55}, més noble que l'or

A German-Swiss team has discovered that Au_{55} clusters are even more resistant to oxidation than bulk gold [H.G. Boyen and coworkers, University of Ulm; *Science*, **297**, 1533 (2002)].

According to the researchers, the extraordinary chemical stability of Au_{55} is not caused by size-induced modifications in the electronic structure. Rather, they believe the stability most likely is due to the cluster's closed-double-shell atomic structure (a plausible model of which is shown).



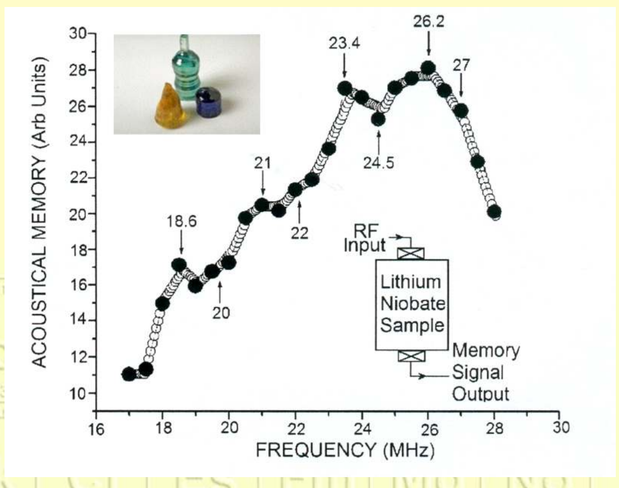
Font: *Chem. Eng. News*, 2 setembre 2002, 29

Cristalls que recorden els sons

Scientists have discovered a crystal ($LiNbO_3$) that answers back. They sent a sound wave into the material, there was a quiet pause, then it suddenly emitted the same sound. [Mack Breazeale and coworkers, University of Mississippi ; *Phys. Rev. Lett.*, **89**, 115506 (2002)].

Each lithium niobate crystal is composed of ferroelectric domains. The frequency of the delayed echoes a crystal produces is related to the size of these domains, which determine the material's suitability for various applications.

The acoustic wave squeezes the material as it passes through. This produces electric fields within the crystal, which in turn move the electrically charged atoms that the solid contains, just as a breeze passing through a cornfield stores energy by bending all the stems. When the acoustic input stops, the ions move back, but not all in the same direction; the movement is divided into domains, separated by boundaries where the direction changes.



Font: *Nature ScienceUpdate*, 23 setembre 2002

Breus

- S'ha preparat el ciclo-N_5^-, anell aromàtic isolectrònic amb el $C_5H_5^-$ (A. Vij, J.G. Pavlovich, W.W. Wilson, V. Vij, K.O. Christe, *Angew. Chem. Int. Ed.*, **41** (2002) 3051).
- El Departament de Química de la Universitat de Cambridge compleix 300 anys.
- Les sis societats de química més importants del món (Estats Units, França, Alemanya, Japó, Holanda i Regne Unit) creen el grup C6.
- Una Taula Periòdica, guardonada amb el Premi IgNobel (**http://www.theodoregray.com/PeriodicTable/**).

L'element número **6**, **carboni**, és conegut des de temps immemorials, tot i que no va ser reconegut com element fins el segle XVIII. El seu nom prové del mot llatí *carbo*.