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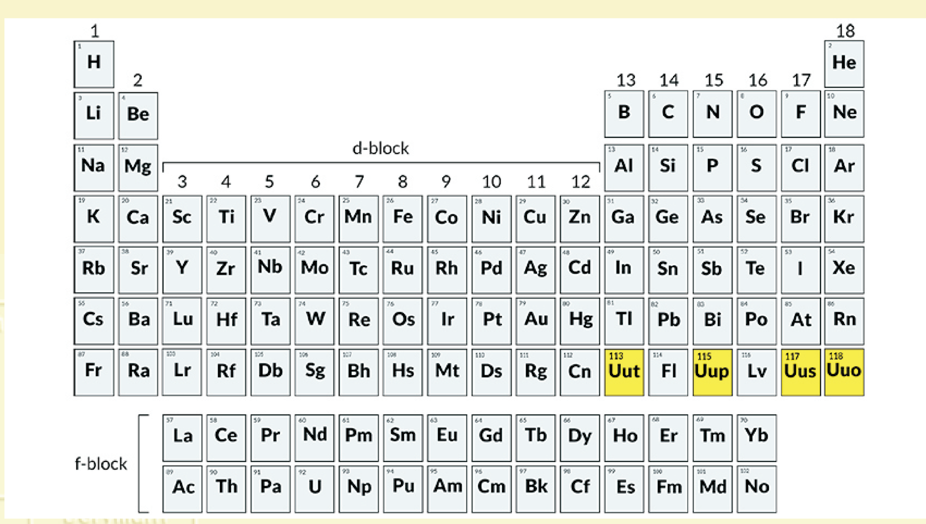
Editors: Gabriel Aullón, Ramón Bosque i Joaquim Sales. Correspondència: noticies@qi.ub.edu

Completat el setè període!!

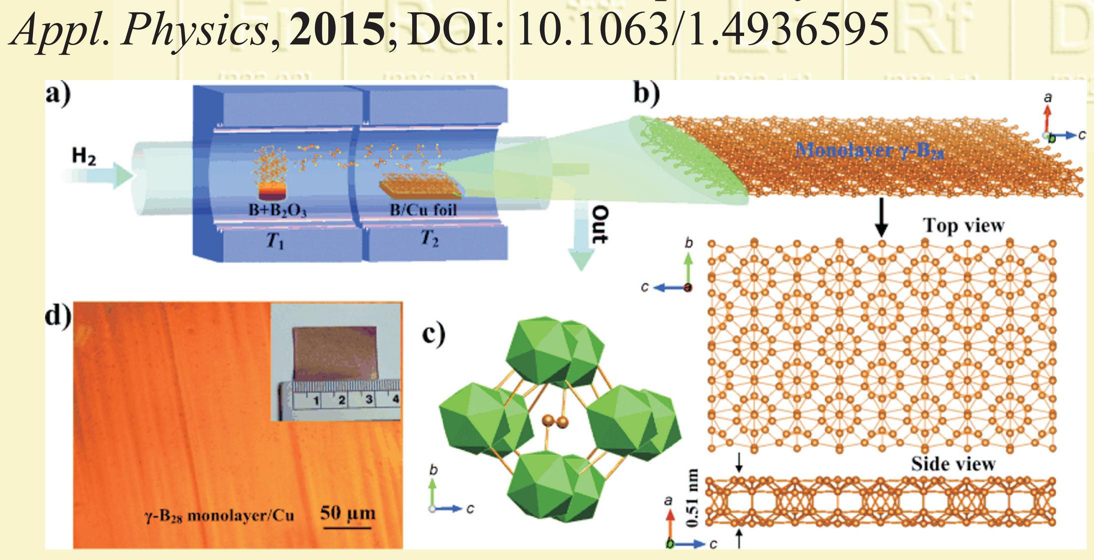
With the addition of four new elements, the seventh row of the periodic table is officially full, IUPAC announced on Dec. 30. A joint committee made up of IUPAC and IUPAP gave its stamp of approval, and IUPAC temporarily gave element 113 the name ununtrium (Uut), 115 the name ununpentium (Uup), 117 the name ununseptium (Uus), and 118 the name ununoctium (Uuo) The RIKEN collaboration team in Japan have fulfilled the criteria for element Z=113 and will be invited to propose a permanent name and symbol. (*IUPAC Technical Report*; DOI 10.1515/pac-2015-0502) The collaboration between the Joint Institute for Nuclear Research in Dubna, Russia; Lawrence Livermore National Laboratory, California, USA; and Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA have fulfilled the criteria for element Z=115, 117 and will be invited to propose permanent names and symbols. The collaboration between the Joint Institute for Nuclear Research in Dubna, Russia and Lawrence Livermore National Laboratory, California, USA have fulfilled the criteria for element Z=118 and will be invited to propose a permanent name and symbol.(*IUPAC Technical Report*; DOI 10.1515/pac-2015-0501)



Nous al·lòtrops de B i C

The first two-dimensional form of boron has been synthesised (G. Tai et al., *Angew. Chem., Int. Ed.*, **2015**, DOI: 10.1002/anie.201509285). The super hard material, which was formed by two-stage chemical vapour deposition, has unusual properties for a two-dimensional material that could potentially make it very useful in nano-electronics – it is an air-stable semiconductor with a direct band gap. The bonding in bulk boron is very strong and yet highly complex and delocalised, and cannot properly be classified as ionic, covalent or metallic. It has at least 16 known polymorphs that exist at different temperatures and pressures. However, no two-dimensional forms of boron have been created, and researchers have debated what such a polymorph would look like. Whereas graphene is simply a single layer of graphite, there exists no planar form of bulk boron from which a single layer could conceivably be exfoliated.

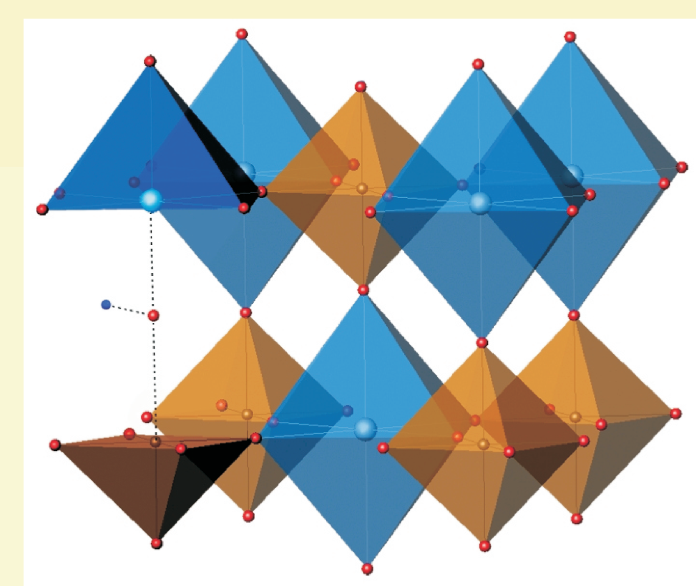
On the other hand, a new phase of solid carbon, called Q-carbon, which is distinct from the known phases of graphite and diamond, has been prepared. Q-carbon has some unusual characteristics, it is ferromagnetic, and harder than diamond. The only place it may be found in the natural world would be possibly in the core of some planets. (J. Narayan et al., *J. Appl. Physics*, **2015**; DOI: 10.1063/1.4936595



a) Schematic representation of the home-made two-zone furnace used to obtain atomically thin 2D γ-B28 films by CVD. b) Top and side views of the monolayer. c) Polyhedral structure of the basic unit cell of the monolayer. Boron atoms forming dumbbells are shown as orange spheres. d) Optical image of a monolayer on Cu foil.

Perovskites de xenó

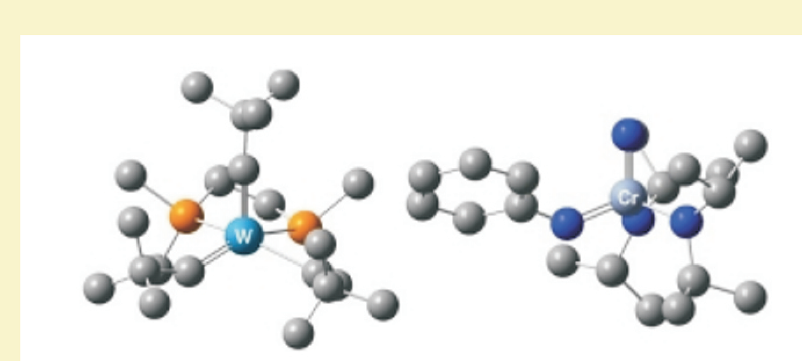
Xenon has done it again—shown itself capable of forming interesting chemical compounds, that is. This time, those compounds take the form of perovskite crystals with the general formula, $KMXeNaO_6$, where M refers to calcium or other group II elements (S. N. Britvin, et al., *Angew. Chem. Int. Ed.* **2015,** *54*, 14340; DOI: 10.1002/anie.201506690). The study shows that the noble gas, which was long thought incapable of forming molecules, actually forms quite an assortment of compounds. The researchers treated anhydrous sodium perxenate, Na_4XeO_6, with KOH solutions of the nitrates of calcium, barium, and strontium. The procedure yielded three-dimensional $KMXeNaO_6$ perovskite framework compounds composed of alternating, corner-sharing XeO_6 and NaO_6 octahedrons. Xenon's ability to work its way into perovskites may provide clues about the "missing xenon paradox." Earth's atmosphere contains far less xenon than expected based on analysis of ancient meteorites. Given that the main silicate in Earth's interior is thought to be a $MgSiO_3$ perovskite, and given that elevated temperatures and pressures induce xenon solubility in silicates, perhaps some of the missing xenon is hiding far below Earth's surface.



This xenon-containing perovskite consists of alternating, corner-sharing XeO_6 and NaO_6 octahedrons. Xe = blue, O = red, Na = gold.

El Cr i el N fan el triplet

In 1978, an unusual tungsten alkylalkylidene-alkylidyne complex, was reported (R. Schrock, et al., *J. Amer. Chem Soc.*, **1978**, *100*, 677; DOI: 101021/ja00489a049). It was notable for being the first transition-metal compound containing single, double, and triple metal ligand bonds in the same molecule. The "yl-ene-yne" complex was one of a string of complexes Schrock and his colleagues made that contributed to Schrock's Nobel Prize-winning olefin metathesis research. Now, the first chromium amido-imido-nitrido complex containing single, double, and triple metal-nitrogen bonds in the same molecule has been obtained (L. Odom et al., *Chem. Sci.* 2016, DOI: 10.1039/c5sc04608d). Such linkages are important in metal complexes to enable diverse reactions, including olefin metathesis, C–H bond activation, and dinitrogen cleavage. The team made the complex by using the strong base potassium hydride to deprotonate one amido linkage in a nitrido tris(amido) chromium complex, forming the imido ligand. Besides the unusual bonding, the new complex displays unusual reactivity, with electrophiles attacking both the imido and nitrido nitrogen atoms.



The Schrock (W) and Odom (Cr) complexes with three types of ligand bonds

Breus

- S'ha proposat un nou mètode ràpid, polit i barat que permet netejar diversos tubs de RMN alhora; només cal una mica de solvent i un dessecador de buit (T. B. Ngnuyen, *Org. Process Res. Dev.*, 2016; DOI:10.1021/acs.oprd.6b00001).
- L'espectrocòpia vibracional ha permès la determinació de l'energia de l'estat de transició de la reacció de conversió del cianur d'hidrogen(HCN) a isocianur d'hidrogen (HNC) (R. W. Field et al., *Science*, **2015**; DOI:10.1126/science.aac9668).
- Després de més de 20 anys, ha estat determinada la primera estructura cristal·lina d'un deoxiribozim (DNAzyme). Aquestes seqüències d'oligonucleòtids de DNA presenten activitat catalítica específica, similar a altres enzims biològics, com proteïnes o ribozims (enzims composts de RNA) (C. Höbarter et al., *Nature,* **2016**; DOI: 10.1038/nature16471).

Avui recomanem

La Biblioteca Patrimonial de la UB (BiPaDi) ha digitalitzat totes les obres dipositades a la UB de Santiago Ramón y Cajal, que fou catedràtic d'Histologia de la Facultat de Medicina de la nostra Universitat entre 1887 i 1892.
(http://bipadi.ub.edu/cdm/search/searchterm/ramon%20y%20cajal/order/nosort)

L'element

L'element número 73, **tungstè**, fou descobert pels químics espanyols Juan José i Fausto Elhúyar l'any 1783, per reducció de l'àcid wolfràmic – obtingut de la wolframita – amb carbó; paral·lelament Carl W. Scheele i T. Bergman, havien indicat que a partir de l'àcid túngstic –obtingut de la scheelita – podia obtenir-se un nou element, que resultà ser el mateix. La IUPAC recomana anomenar-lo tungstè, del nom suec del mineral *tungs ten* (pedres pesants) i emprar l'arrel "wolfra-" per als seus composts; en espanyol, però, se l'anomena wolframio. Les principals menes són la wolframita, $(Fe,Mn)WO_4$ i la scheelita, $CaWO_4$, especialment abundants a la Xina, que disposa de 2/3 parts de les reserves mundials, estimades en uns 5 milions de Tm; la producció anual és d'unes 40.000 Tm. Una de les principals aplicacions és com a component de l'acer fent-lo més dur i resistent, que l'ha fet molt útil en la indústria de guerra, a partir de la primera Guerra Mundial. Una altra aplicació quotidiana - que s'està acabant - és com a filament de les tradicionals bombetes d'incandescència. Hi ha cinc isòtops naturals, cap d'ells radioactiu; és un element no gaire abundant a l'escorça terrestre, ca. 1 ppm. És l'element més pesant amb una activitat biològica coneguda, encara que no gaire significativa, és un nutrient per alguns bacteris, però no pels eucariotes. Recentment s'han fet estudis amb el wolframat de sodi com a possible medicament per al tractament de la diabetis.