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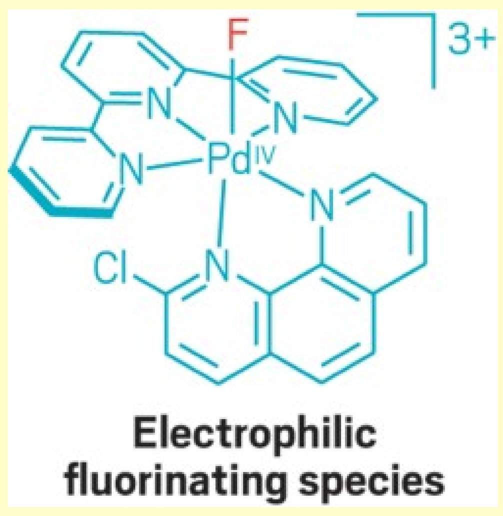
http://www.ub.edu/inorgani/dqi.htm

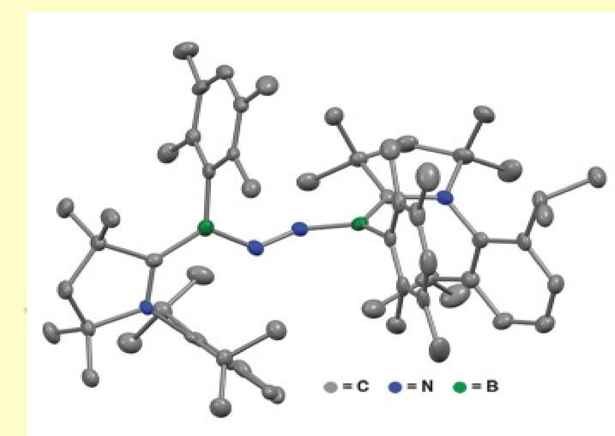
El Pd fluora el C



A general and mild method for turning aromatic C–H bonds into C–F bonds offers chemists a way to create fluorinated molecules that were difficult to make before. Because the chemistry tolerates a broad range of functional groups, it can fluorinate molecules in the later stages of a chemical synthesis. (T. Ritter et al, *Nature* **2018**; DOI: 10.1038/nature25749). Chemists have already come up with good ways to fluorinate alkyl C–H bonds. But until now, there's been no general way to directly fluorinate arenes. Chemists have had to use harsh reagents, such as fluorine gas, which destroy other functional groups in a molecule. Milder fluorinating reagents work on only a limited subset of substrates. The complex, which forms catalytically during the transformation, reacts with a wide array of arenes, leaving functional groups such as esters, chlorides, and sulfonamides unscathed. The reaction generally installs the fluoride in the position that's ortho or para to the arene's most electron-rich substituent.

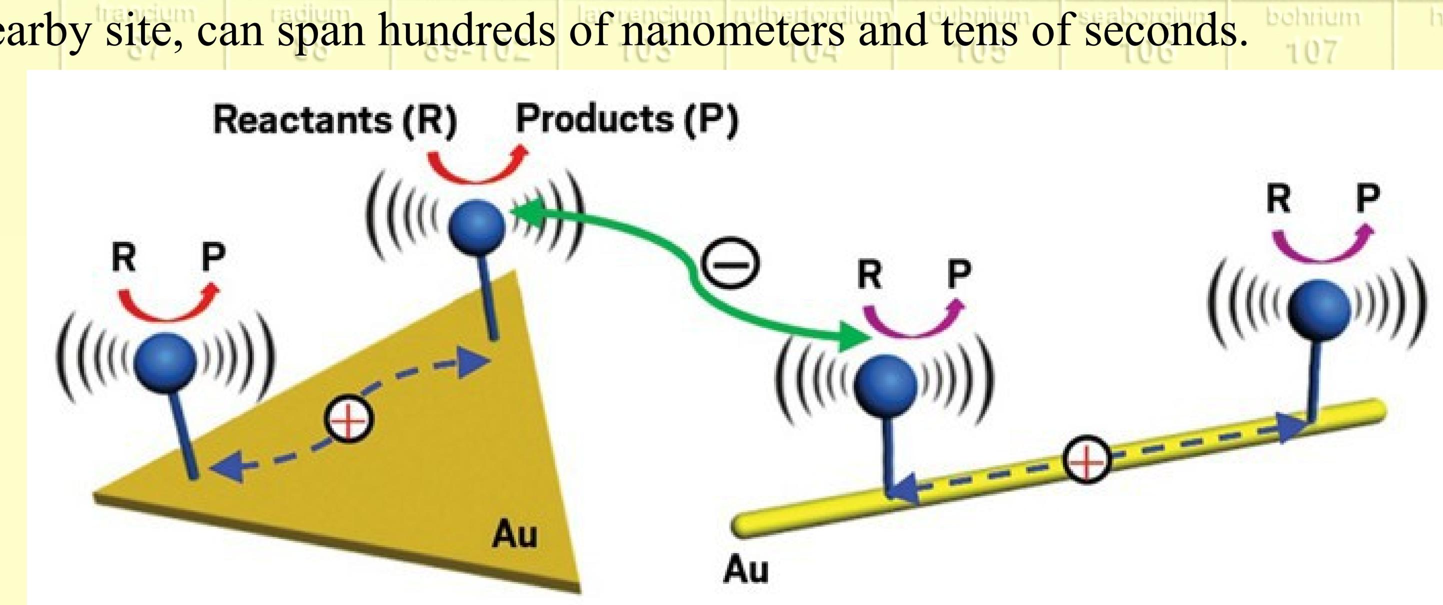
Borilens capturen el nitrogen

Boron has mastered masquerading as a metal. In recent years, compounds with the little p-block element have managed to latch onto small molecules, such as hydrogen and carbon monoxide, that chemists previously thought only metals could bind and split. Now, boron has gotten hold of the most stubborn small molecule, N_2. A team (H. Braunschweig et al, *Science* **2018**; DOI: 10.1126/science.aaq1684) managed the feat by using a borylene—the boron version of a carbene—which features a monovalent boron, a lone pair of electrons, and an empty orbital. The borylene mimics a very electron-rich transition metal, it donates its electron density to activate the stable N≡N bond. Although the finding might someday help improve large-scale nitrogen-fixing reactions, such as the ammonia-making Haber-Bosch process, that goal is a long way off. At the moment, the reaction, which requires two borylenes for every N_2 molecule caught, isn't catalytic.



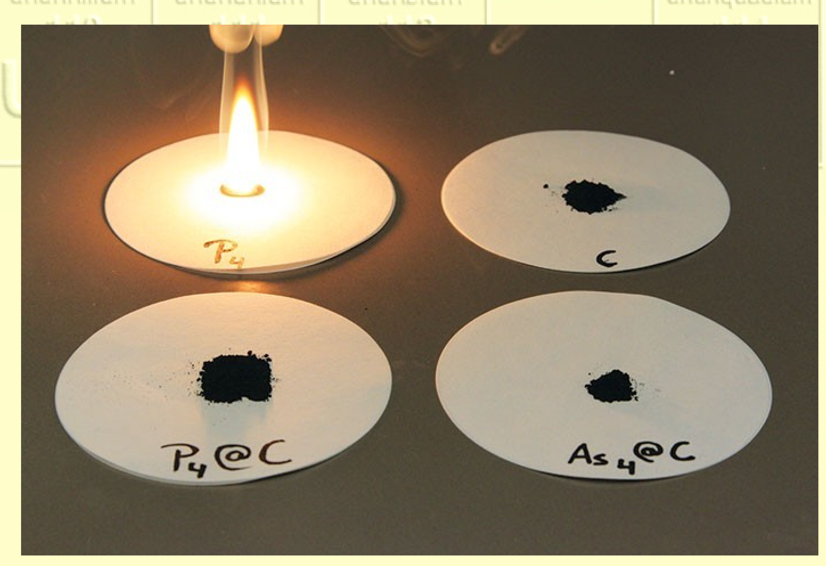
Catalitzadors comunicats per Wifi

Nanoparticle catalysts obviously can't talk but a new study suggests they've found a way to communicate with each other. By using a method that tracks single-molecule reactions on individual nanoparticles, researchers have shown that catalytic reactions occurring at one active site on a particle can influence reactions occurring at another site (P. Cheng, et al, *Nat. Chem*. **2018**; DOI: 10.1038/s41557-018-0022-y). It is known the so-called allosteric effects in enzymes, in which a molecule binding at one site influences chemical activity at another site on the enzyme. To determine whether solid nanoparticle catalysts exhibit a related type of chemical communication, a team scrutinized nanoparticles made of either gold or palladium as the materials mediated various types of model catalytic reactions. The reactions converted nonfluorescent reactants to highly fluorescent products, allowing the researchers to watch the process unfold using high-resolution fluorescence microscopy methods. By analyzing single-molecule data pooled from a large number of particles, the team found that a catalytic reaction that occurred at one active site can affect the probability of a reaction occurring at another site on the same particle or on a nearby particle. This communication, in which a reaction at one site tends to be followed by a reaction at a given nearby site, can span hundreds of nanometers and tens of seconds.



El C_{negre} estabilitza el P_{blanc} i el As_{groc}

Although the elemental allotropes white phosphorus (P_4) and yellow arsenic (As_4) have the potential to be useful reagents, these compounds aren't commonly used by chemists because of their notorious instability. White phosphorus will burst into flame when exposed to air, light-sensitive yellow arsenic turns to gray arsenic. Chemists have been working to create materials in which these allotropes can be stored stably, but their success has been limited. Now, a team (M. Scheer et al, *Nat. Commun*. **2018**; DOI: 10.1038/s41467-017-02735-2) has found that the pores within activated carbon work well at storing both white phosphorus and yellow arsenic. What's more, the elements can be released from the activated carbon into solution, where they can subsequently be used as reagents. The material is prepared by adsorbing a solution of P_4 or As_4 in tetrahydrofuran onto activated carbon with a defined pore size and distribution. After centrifugation, decanting, and drying, the resulting black powder can be stored on a benchtop and exposed to light and air with only minimal decomposition.



White phosphorus bursts into flame when exposed to air but is stable when encapsulated in activated carbon.
Yellow arsenic is also stable when stored in activated carbon.

Breus

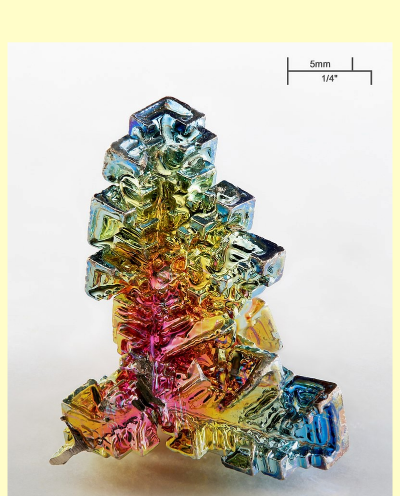
- En motiu del primer aniversari del seu traspàs, l'ACS ha homenatjat Eugene Gardfield (1925-2018), pioner de la informació química, creador de l'índex d'impacte i fundador del Institute for Scientific Information (ISI). La UB li conferí el grau de Doctor Honoris Causa, el juny de 2016.
- La National Science Fundation (NFS) dels EUA demanarà, a partir d'ara, informació específica sobre qualsevol acte d'assatjament sexual dels participants en el projecte. S'aplicaran las mateixes sancions que per mala conducta investigadora.
- El corall es roba cada dia més amenaçat, als riscos de sobrepesca, canvi climàtic i acidificació dels mars, s'hi afegeix, ara, els residus de plàstics.Un estudi ha demostrat que el risc de malaltia ha augmentat del 4 al 89% (*Science,* **2018**; DOI: 10.1126/science.aar3320).

Avui recomanem

El llibre «The posthumous Nobel Prize in Chemistry. Volume 1. Correcting the Errors and Oversights of the Nobel Prize Committee», coordinat per E.T. Strom i V.V. Mainz, publicat per l'ACS. Es tracten els casos de Mendeléiev, Lewis, Ingold, Hammett i Bartlett, entre d'altres.

L'element

L'element número 83, **bismut**, és conegut des de l'antiguitat, en què es confonia amb l'estany i el plom; la seva identitat com a element l'establí Claude Geoffroy l'any 1753. L'origen del nom és incert, hi ha qui diu que prové de l'àrab bi ismid que vol dir semblant a l'antimoni, o bé de l'alemany weiße Masse, massa blanca, que es traduí al llatí bisemutum. Tradicionalment s'ha considerat l'element estable de pes atòmic més alt, però l'any 2003 es descobrí un isòtop radioactiu, Bi-209, amb una vida mitjana de l'ordre de 10^{19}, molt superior a l'edat de l'univers, raó per la qual es pot continuar considerant estable. Es troba a la naturalesa lliure, en menes de níquel, plata i estany, i en forma de bismutina, Bi_2S_3, a Bolívia, Perú i Mèxic. Les principals aplicacions són com a catalitzador en la fabricació d'acrilonitril, en la industria de fibres sintètiques i cautxú. S'utilitza en la síntesi d'elements superpesants, pel mètode denominat "fusió freda", consistent en bombardejar-lo amb elements lleugers, que ha permès la detecció de bohri, meitneri i roentgeni. No té cap paper biològic ni presenta problemes de contaminació, sent així dels metalls pesants més benigne. Algunes sals bàsiques com el $BiNO_3(OH)_2$, s'ha usat, com a remei per a les llagues d'estómac.



Cristall de bismut, recobert d'òxid, que mostra les propietats iridiscents.