PremC Conferences, Events & Workshops

PBSi 2017

International Conference On Phosphorus, Boron and Silicon

July 3-5, 2017 | Paris

Merging Boron clusters with P and Si aiming to Nanomaterials for Catalysis, Electronics and Medicine

PROF. CLARA VIÑAS
Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Campus U.A.B. Spain.

The twelve-vertex closo C2B10H12 icosahedral carboranes have been the most widely studied polyhedral Boron clusters. Icosahedral carboranes act as strong electron-withdrawing ligands through substitution on carbon2 and as electron-donating moieties when substitution is through the boron vertices in a regioselective manner, and have many possible sites of substitution, up to twelve. Their unique stability and geometrical properties suggested these species as building blocks for stereo precise structural platforms of novel reaction centers having properties that cannot be achieved with organic hydrocarbon compounds.
The aim of this presentation is to show the ability of boron clusters in producing new molecules for targeted applications in nanomaterials and nanomedicine.1
1) Crossing B clusters and P for catalysis: the accurate selection of a ligand for a metal-catalyzed homogeneous reaction can be as decisive as the selection of the metal. Incorporating a carborane cage as a backbone to produce new phosphines often leads to remarkable properties. The cooperation between the cluster moiety and the P atom may result in mono-, di- and tridendicity according to the necessities of the metal, not an ever-available property for organic phosphines.2
2) Crossing B clusters and Si for electronics: carboranylsilane dendrimers/dendrons3 and carboranyl photoluminescent octasilsesquioxanes (POSS) and redox-active metallacarborane POOS with enhanced thermal stability have been prepared.4
3) Crossing B clusters and P for nanomedecine: Purely inorganic carboranyl phosphinates were prepared, and their ability to coordinate on surface of magnetite/maghemite nanoparticles studied.5

1. R. Núñez, I. Romero, F. Teixidor, C. Viñas, Chem. Soc. Rev. 2016, 45, 5147-5173.
2. A. R. Popescu, F. Teixidor, C. Viñas, Coord. Chem. Rev. 2014, 269, 54-84.
3. C. Viñas, F. Teixidor, R. Núñez, Inorg. Chim. Acta 2014, 409, 12-25.
4. J. Cabrera-González, V. Sánchez-Arderiu, C. Viñas, T. Parella, F. Teixidor, R. Núñez Inorg. Chem. 2016, 55, 11630−11634.
5. E. Oleshkevich, F. Teixidor, D. Choquesillo-Lazarte, C. Viñas, Chem. Eur. J. 2016, 22, 3665 – 3670.