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Fascinating boron-nitrogen-containing heteroaromatic compounds: Electronic structure analysis

Boron(B)-nitrogen(N)-containing hetero-aromatic compounds are a family of heterocycles that are isoelectronic and isostructural to the family of classical organic counterparts as for example benzene, naphthalene and anthracene, and also as mono-nitrogen containing heterocycles such as pyrrole, indole and iso-indole. Their development significantly expands the structural diversity and potential utility of aromatic compounds, but the properties and reactivity of such BN-aromatic heterocycles have not been fully explored due to the lack of available synthetic methods for their preparation. To improve our understanding of the electronic structure of the aromatic BN heterocycles, we have studied monocyclic, bicyclic (BN five- and six-membered heterocycles) and tricyclic analogs, using a combined UV-photoelectron spectroscopy (UV-PES)/computational approach. Ultraviolet photoelectron spectroscopy (UV-PES) is a well-established technique to provide ionization energies of molecules in gas phase. These experimental data supported by quantum calculations for the consistency of the assignments of PE bands provide fundamental information about electronic structure and bonding that is obtained by no other technique. Representative examples to illustrate the advantages and wide applicability of this approach will be exclusively chosen from our research in the field of Boron(B)-nitrogen(N)-containing hetero-aromatic compounds.

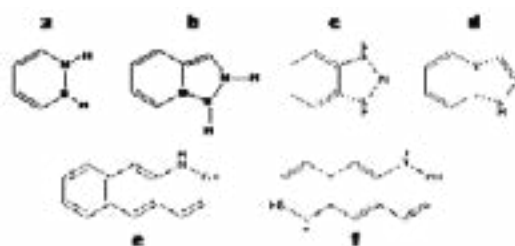


Figure 1: a 1,2-dihydroborazine, b fused BN indole, c indole BN indole, d BN iso-indole, e BN anthracene, f bis-BN anthracene.

Biography

Anna Chrostowska has obtained her PhD degree in Chemistry in 1986 from the Warsaw University of Technology (Poland). She started her academic career at the Agriculture University of Warsaw in 1984. In 1991, she moved to the University of Pau, where she is working as a Professor at the Research Institute on Analytical Sciences and Physical Chemistry for Environment and Materials (IPREM). She teaches Organic and Organometallic Chemistry for License and Master's program. Her research is centered on experimental and theoretical studies of the electronic structure and reactivity of organic and organometallic species in the gas phase. She has published over 80 scientific papers, supervised 15 PhD candidates and was invited by different German, Japanese, Chinese, Polish, Canadian or American Universities. She was a Dean of the Chemistry department, the President of the Research Council of Sciences at the University of Pau and is actually a Director of the Doctoral School "Exact Sciences and their Applications".

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