P-containing Polycyclic Aromatic Hydrocarbons: synthesis, coordination chemistry and optical properties

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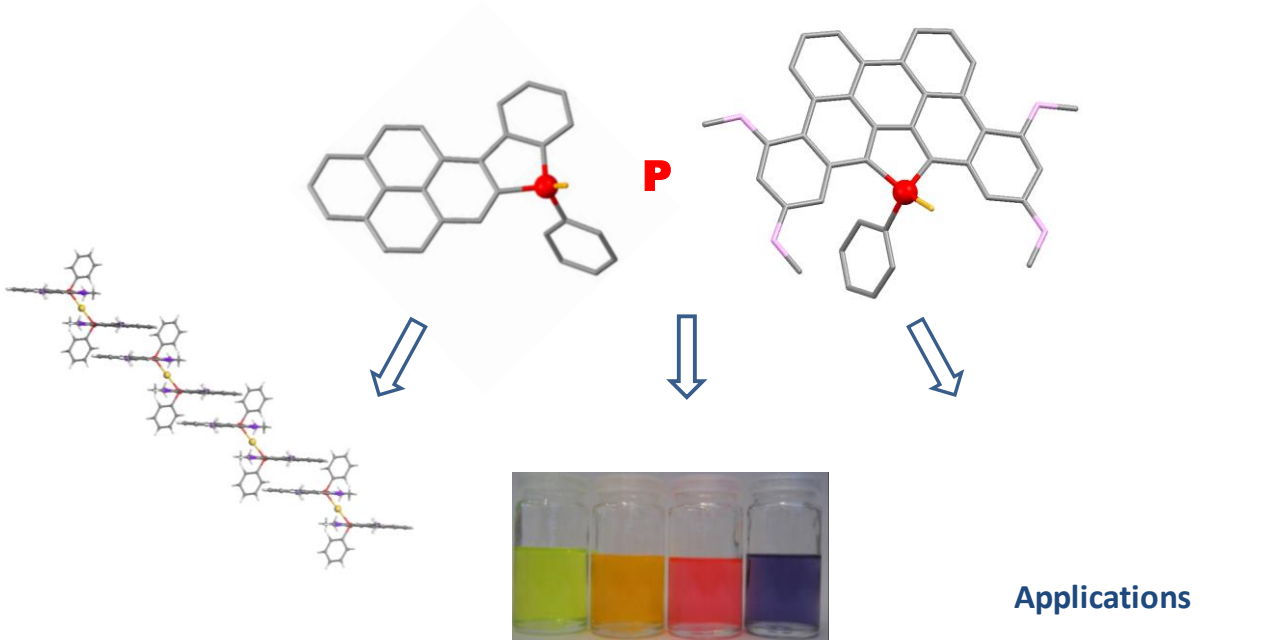
The discovery of low-dimensional carbon nanostructures (nanotubes, graphene…) led to a new era in the field of carbon-based materials for optoelectronic applications and more generally in nanotechnologies. In this context, synthetic chemists have a key role to play as they can provide structurally perfect molecular systems (also called nanographene or Polycyclic Aromatic Hydrocarbons PAHs) and thus give access to precise structure-properties relationships. An original approach to tune their bandgap uses the versatility of heterochemistry with the successful incorporation of N, O, S or B within the π -conjugated framework of PAHs.[1]

Here, we report that this strategy can be extended to P-modified PAHs. The synthesis of these unprecedented derivatives using various organometallic and/or metal-catalyzed approaches will be presented.[2] The reactivity of the P-center allows a straightforward HOMO-LUMO gap-tuning. DFT calculations corroborate these studies.[3] Furthermore, the coordination ability of the P-center allows unprecedented coordination-driven assembly of PAHs onto transition metals.[4] The incorporation of these molecules in White emitting OLEDs showed the potential of this new family of compound for opto-electronic applications.[5]



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