PHOSPHORENE: THE P-ANALOGUE OF GRAPHENE

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Recently it was discovered that black phosphorus (BP), a bulk layered material, can be exfoliated either by Scotch tape method[1] or by ultrasound activation in a medium with high dielectric constant[2]. The monolayer BP nanosheet, nicknamed phosphorene, which results from the exfoliation procedure, is a new 2D material endowed with peculiar characteristics, due to its puckered honeycomb structure, but unlike graphene, possesses intrinsic semiconductor properties. This opens the way to many important applications for high-performance electronic and optoelectronic devices.[3] In this lecture, we'll focus on the preparation of phosphorene by liquid exfoliation in dimethylsulfoxide especially highlighting the unexpected role of water in the process.

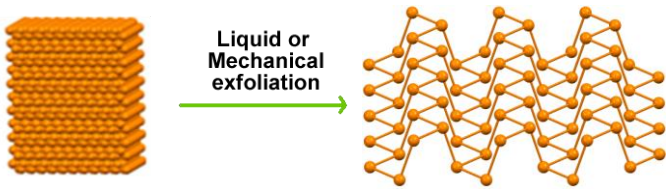

Figure 1. Top-down approach to prepare phosphorene from black phosphorus.

Moreover, our preliminary studies on the functionalization of phosphorene will be presented and discussed, highlighting, for instance, the immobilization of transition metal nanoparticles on the polyphosphorus network aimed at preparing new advanced nanostructured catalysts.

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References

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