

# Water influence in the preparation and stabilization of high quality phosphorene flakes

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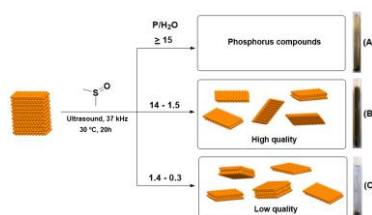
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2D nanomaterials are very promising in nanodevice applications due to their surprising properties such as high electric mobility, outstanding structural properties, and large specific surface area [1]. Recently, phosphorene (Figure 1), the all-P counterpart of graphene, has been prepared starting from black phosphorus (BP) [2]. Small amounts of single and few layers sheets of the new material have been obtained by either micromechanical cleavage (Scotch tape method) or liquid exfoliation.[3].

Herein, we provide a detailed study of the influence of water in the exfoliation of black phosphorus in dimethylsulfoxide, by examining the role played by the amount of water. Three different ranges of molar ratio between black phosphorus and water were considered. Atomic force microscopy, scanning electron microscopy, and transmission electron microscopy gave information on the morphology of black phosphorus nanosheets and their lateral dimension and thickness. X-ray powder diffraction proved the crystalline nature of the samples and also the chemical composition of the material in each condition tested. Comparing the data, an evident and dramatic influence of the concentration of water on the quality of the BP atomic layers is observed and highlights the best working conditions to be adopted in the exfoliation process (Figure 1) in order to get good quality phosphorene flakes [4].



**Figure 1**

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