

Scaling up prospective for the production of graphene and other 2D crystals

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We propose liquid-phase exfoliation of layered materials [1,2] as a simple and cost-effective pathway to fabricate various two-dimensional (2D) crystals. We exploit solution processed 2D crystals for the design and realization of (opto)electronic and energy devices, presenting huge integration flexibility compared to conventional ones.[1-6] However, a key requirement for the realization of such applications is the development of industrial-scale, reliable, cost-effective production processes,[2] while providing a balance between ease of fabrication and final material quality with on-demand properties. Here, I will show our scaling up approach for the solution processing of 2D crystal based on wet-jet milling of layered materials. Moreover, I will present an overview of 2D crystals for flexible and printed (opto)electronic and energy applications, from the fabrication of large area electrodes³ to devices integration.[6-13]

References

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Figures

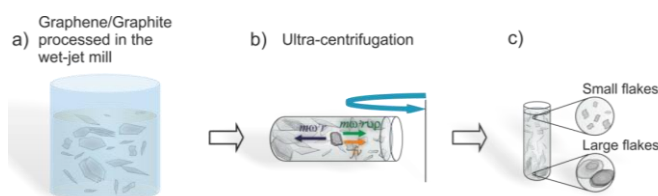


Figure 1: (a) Purification of the wet-jet milled graphite carried out by (b) sedimentation based separation, applying a centrifugal force to sort the flakes according with their morphological properties. (c) This procedure allows the thinner and smaller flakes enriching the supernatant, while the large or un-exfoliated flakes sediment at the bottom of the centrifuge tube.