Graphene, other 2D crystals and hybrid superstructures for energy and (opto)electronic applications

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Abstract

Graphene, thanks to its excellent material properties, has the opportunity to improve the performance of existing devices or enable new ones[1-6] that are also environmentally friendly.[7] Graphene is just the first of a new class of two dimensional (2D) crystals, derived from layered bulk crystals.[2] The assembly of such 2D crystals (heterostructures) will provide a rich toolset for the creation of new, customised materials.[1,2]

A key requirement for applications such as flexible (opto)electronics and energy storage and conversion is the development of industrial-scale, reliable, inexpensive production processes,[2] while providing a balance between ease of fabrication and final material quality with on-demand properties.

Liquid-phase exfoliation[2] is offering a simple and cost-effective pathway to fabricate various 2D crystal-based (opto)electronic and energy devices, presenting huge integration flexibility compared to conventional methods. Here, I will present an overview of graphene and other 2D crystals for flexible and printed (opto)electronic and energy applications, starting from solution processing of the raw bulk materials,[2] the fabrication of large area electrodes[3] and their devices integration.[6-12]

References

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