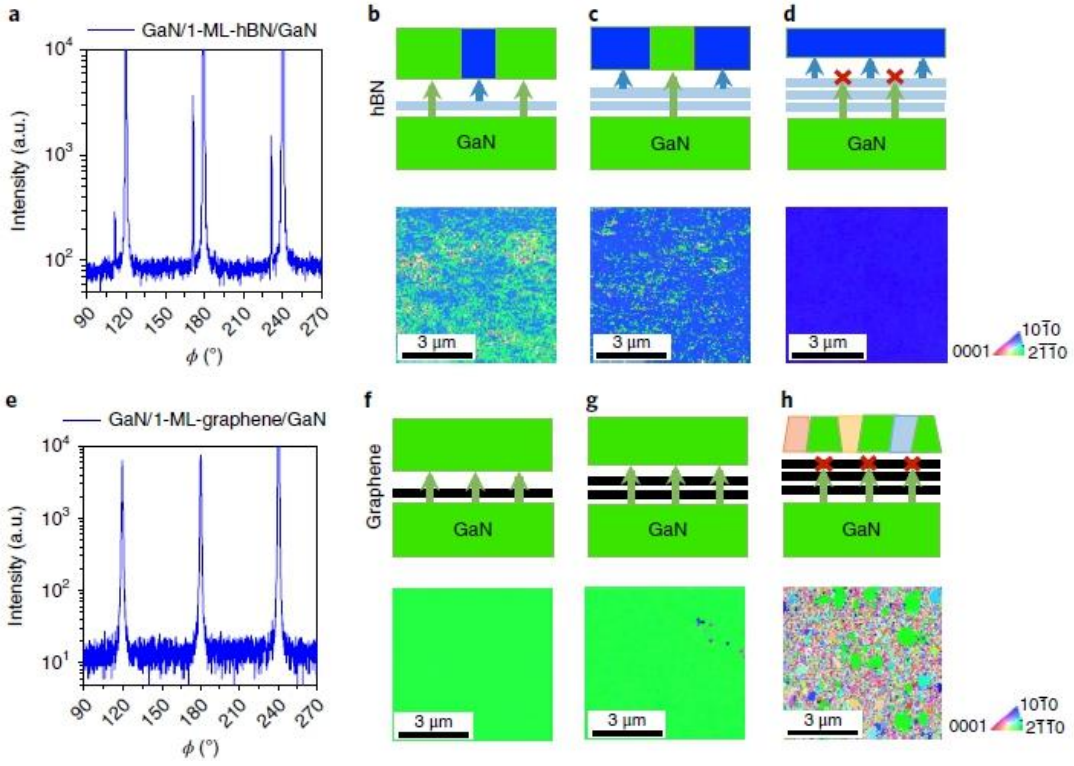
Polarity governs atomic interaction through two-dimensional materials

Speaker:黃盈盈　Adviser:鄭沐政 老師 2019/04/29

Abstract:

It is found that remote atomic interaction through 2D materials depends on the polarity of atomic bonds. We show that 1ML graphene will shield the potential field from covalent-bonded materials, but that from ionic-bonded materials is strong to penetrate through a few layers of graphene. Such field penetration is greatly attenuated by 2D h-BN with its polarization in its atomic bonds. Based on the control of transparency, the nature of materials and interlayer thickness, different types of single-crystalline materials across the periodic table can be epitaxially grown on 2D material-coated substrates. The epitaxial films can subsequently be released as independent membranes, providing the heterointegration of arbitrary single-crystalline thin films in functional applications.



Main References:

1. Wei Kong. et al. Polarity governs atomic interaction through two-dimensional materials. Nature Materials volume 17, pages999–1004 (2018)

2. Kim, Y. et al. Remote epitaxy through graphene enables two-dimensional material-based layer transfer. Nature 544, 340–343 (2017).