Superperiodicity Induced Band Gap In Graphene

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Although graphene hosts a number of fascinating properties suitable for nanoelectronic applications, it lacks a sizeable energy gap in its electronic structure. Numerous methods have been proposed to produce a semiconducting graphene [1,2]. We have recently shown a band gap of more than 0.5eV in buffer layer graphene, i.e. the precursor growth state of graphene [3].

By using different experimental techniques such as scanning tunneling microscope (STM), high-resolution scanning transmission electron microscope (HR-STEM) and angle-resolved photoemission spectroscopy (ARPES), we show that the band structure in the buffer has an electronic periodicity related to the structural periodicity observed in STM and X-ray diffraction [4]. Our ARPES analysis confirmed the observed bandgap is due to the super periodicity induced by the substrate [5].

References

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Figures

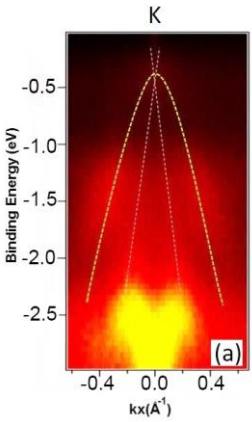

Figure 1: ARPES band structure of buffer layer graphene