Contribution ID : **24** Type : **Invited Oral**

The Experimental Realization of Polyphony in Borophene

Wednesday, 15 August 2018 11:00 (30)

The boom of graphene research, as well as the successful development of high-quality graphene films for industrial applications, has inspired the theoretical prediction and experimental discovery of a number of elemental two-dimensional (2D) materials. Boron (B), the one-electron-lacking neighbor of carbon in the periodic table, is identified by rather different chemistry as compared to C. A mixture of honeycomb units together with triangular units in two-dimensional (2D) sheets was predicted to be more stable. This gives rise to rich allotropy of boron, which is seen in the possibility of its multiple phases in borophene. In this talk, I will introduce the experimental realization of borophene on Ag(111) surface by molecular beam epitaxy (MBE) growth in ultrahigh vacuum firstly. A few different phases relied on the substrate temperature during growth are confirmed. Furthermore, it is found that the crystalline symmetry of substrate can influence the morphology of borophene. The high quality borophene nanoribbons can be formed on an anisotropic substrate - Ag(110). By engineering the interface interactions and the charge transfer between substrate and borophene, we can realize the a purely honeycomb, graphene-like borophene on Al(111) surface. Theoretical calculations show that the honeycomb borophene on Al(111) is energetically stable. Remarkably, nearly one electron charge is transferred to each boron atom from the Al(111) substrate, in contrast to the little charge transfer in B/Ag(111) case. At last, I will show the angle-resolved photoemission spectroscopy measurements on borophene on Ag(111), which revealed Dirac cones in first Brillouin zone, proving the existence of Dirac fermions in borophene.

Primary author(s) : Prof. CHEN, Lan (Institute of Physics, Chinese Academy of Sciences)

Presenter(s) : Prof. CHEN, Lan (Institute of Physics, Chinese Academy of Sciences)

Session Classification : Speaker Sessions and Seminars

Track Classification : Surface Science