

S2-004

Electronic Structures of Graphene Intercalated by Oxygen on Ru(0001): Scanning Tunneling Spectroscopy Study

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Graphene is the hottest topic in condensed-matter physics due to its unusual electronic structures such as Dirac cones and massless linear dispersions. Graphene can be epitaxially grown on various metal surfaces with chemical vapor deposition (CVD) processes. Such epitaxial graphene shows modified electronic structures caused by substrates. In the method for removal of the effect of substrate, there are bi, tri-layer graphene, gold intercalation, and oxygen intercalation.

Here, We will present the changes of geometric and electronic structure of graphene grown on Ru(0001) by oxygen intercalation between graphene and Ru(0001). Using Scanning tunneling microscopy (STM) and spectroscopy (STS), we observed the aspect that the band gap features near the fermi level of graphene on Ru(0001) system is shifted and narrow. Based on the observed results, two effects by intercalated oxygen were considered.

Keywords: Graphene, Ru(0001), rippled structure, oxygen, intercalation