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Manipulation of electrical properties in CVD-grown twisted bilayer graphene induced by dissociative hydrogen adsorption

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The effect of hydrogen adsorption on twisted bilayer graphene (tBLG) was studied. Raman spectroscopy and the electrical transport properties (electrical resistance and thermoelectric power) confirm that the electron doping by hydrogen adsorption, in agreement with the previous report involving exfoliated bilayer graphene (BLG). Common electron doping behavior were observed at various twist angles (0o, 5o, 12.5o and 30o), and the adsorptions follow the first–order Langmuir-type adsorption model. Specifically, we analyzed the off-state currents, with band-gap openings of around 13 meV in tBLG with twist angle of 0o, as in Bernal-stacked BLG.

Biography

Yung Woo Park graduated summa cum laude in 1975 from the Physics Department of Seoul National University in South Korea. He received his PhD from University of Pennsylvania, Philadelphia, United States in 1980. His PhD thesis on the "Electrical Transport Studies of Pure and Doped Polyacetylene" was supervised by Professor Alan J Heeger. He was involved in the original discovery of conducting polymers in 1977 under the guidance of Prof. Alan J Heeger. He has made unique contributions on the synthesis and transport studies of carbon based nanostructures such as conducting polymer nanofibers, carbon nanotube, organic conductors, molecular conductors and graphene. He has also contributed significantly to the transport and mechanism studies of highly correlated materials, such as high Tc superconductors. In particular, his recent discovery of "Zero magneto resistance in polymer nanofibers" is his most important and seminal achievement. In particular, the CNT based nonvolatile MEMS memory has achieved a 1000 times faster switching speed, applicable to the MP3s, smart phones and cameras with very low power consumption and possible multinary bit devices.

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