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Is graphene more conductive than h-BN? XIAOLIANG ZHONG, Department of Physics, Michigan Technological University, RODRIGO AMORIM, Physics Department, Uppsala University, ALEXANDRE ROCHA, Instituto de Física Teórica, Universidade Estadual Paulista (UNESP), RAVINDRA PANDEY, Department of Physics, Michigan Technological University — Electronic tunneling through multilayers of graphene and h-BN sandwiched between gold electrodes is investigated by density functional theory together with the non-equilibrium Green's Function method. The calculated results predict similar transmittance characteristics for the device configuration consisted of graphene and h-BN monolayers, though the pristine graphene and h-BN layers are semimetal and semiconductor, respectively. The h-BN monolayer exhibits a higher degree of p-type doping due to electron transfer from boron to the contact gold atoms relative to that predicted for graphene. A strong coupling of electrode-monolayer at the device interface is therefore likely to be the cause of similar vertical electron tunneling characteristics of the device configurations considered. For the multilayer cases, h-BN shows an exponential dependency of transmission function on the number of layers, whereas multilayer graphene exhibits relatively high tunneling probability due to a stronger interlayer coupling between adjacent layers of graphene.

Xiaoliang Zhong
Department of Physics, Virginia Tech

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