Graphene as the Ideal Material to See Atomic Features in the Voltage Drop?

Kirk H. Bevan

McGill University, Montreal, Quebec, Canada H3A 0C5
kirk.bevan@mcgill.ca

Abstract
Advanced measurement techniques possessing nanoscale and atomic scale resolution have played a pivotal role in the development of photovoltaic, energy storage, fuel cell technologies over the past decade. Amongst all such characterization tools, scanning tunneling potentiometry (STP) provides indispensable insight into the nature of the potential drop within such devices. Recent STP advances have been driven by a desire to better understand charge transport across active interfaces at ever increasing levels of resolution. The ultimate resolution limit of any scanning probe method lies at the scale of single atoms and even atomic orbitals. Though this is now achievable with scanning tunneling microscopy (STM), the conclusive observation of atomic scale features in STP imaging has remained elusive. This is partly due to the fact, that it is not fully understood what unique potential drop features one might expect to observe at atomic length scales − if any at all. Motivated by the desire to better chart this unknown, we present a computational first-principles study of atomic scale STP imaging on graphene with encouraging atomic scale feature predictions [1] .

References

[1] *Nanotechnology* **25**, 415701 (2014).

Figures