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Planar tunneling spectroscopy of graphite[1] RICHARD JONES, WAN KYU PARK, SAM JOHNSON, XIN LU, NADYA MASON, LAURA GREENE, University of Illinois at Urbana-Champaign — The electronic properties of graphite/graphene have become an intriguing area of research in recent years. Probing their electronic density of states (DOS) is of fundamental importance. For this purpose, we choose to do tunneling spectroscopy based on planar junctions. We prepare planar tunnel junctions on graphite using superconducting and normal metal counter-electrodes. An AlO_x tunnel barrier is deposited onto a cleaved surface of HOPG using atomic layer deposition, reactive sputtering, thermal oxidation, or plasma oxidation. Differential conductance spectra are taken as a function of temperature down to 4.2K. In general, conductance increases with bias-voltage, which is qualitatively consistent with the predicted DOS in graphite. However, variances in the detailed structures are observed, including a zero-bias conductance dip and multiple peak and hump structures. We will also discuss different growth techniques we propose to yield reproducible junction characteristics.

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