

Abstract Submitted
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Electrochemistry of individual monolayer graphene sheets WAN LI, CEN TAN, MICHAEL A. LOWE, HÉCTOR D. ABRUÑA, D.C. RALPH, Cornell University — We report on the fabrication and measurement of devices designed to study the electrochemical behavior of individual monolayer graphene sheets. We have examined both mechanically exfoliated and chemical vapor deposited (CVD) graphene. The effective device areas, determined from cyclic voltammetric measurements, show good agreement with the geometric area of the graphene, indicating that the redox reactions occur on relatively clean graphene surfaces. The electron transfer rates of ferrocenemethanol at both types of graphene electrodes were found to be more than 10-fold faster than at the basal plane of bulk graphite, which we ascribe to corrugations in the graphene sheets. We also demonstrate real-time electrochemical detection of molecular desorption from graphene surfaces. Our results show that electrochemistry can provide a powerful means of investigating the kinetics of interactions between molecules and graphene.

Wan Li
Cornell university

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