

Abstract Submitted
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Electrical conductivity of individual, thermally reduced graphene oxide sheets¹ INHWA JUNG, DMITRIY DIKIN, Northwestern University, Evanston, Illinois, RICHARD PINER, ROD RUOFF, University of Texas at Austin — Electrical properties of individual graphene oxide sheets were investigated. Graphene oxide itself is insulating, but its conductivity is finite and measurable following heat treatment in vacuum. The dependence on temperature and time for reduction of graphene oxide were fit to a standard chemical kinetics rate law and from this an activation energy of 30 kcal/mole was found. I-V curves, obtained at several stages of the chemical reduction achieved by heating, are non-linear and slightly asymmetric. The effect of applying an electric field via a back gate and the resulting change in resistance was measured at different temperatures and at different stages of reduction. The maximum conductivity by thermal annealing graphene oxide sheets was 85 S/m at room temperature and zero gate potential. This value was determined based on 4-probe pseudo Van der Pauw measurements and numerical modeling and using 1.0 nm as the sheet thickness.

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