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Infrared Transmission of Chemically Reduced Graphene Oxide from 0.2-200THz[1] JAMES HEYMAN, MICHAEL RICHTER, Macalester College — Single-layer graphene oxide can be chemically reduced and deposited from solution to form conducting films of graphene flakes in an inexpensive, versatile and scalable process. However, chemically reduced graphene oxide (CRGO) films produced to date have low DC conductivities (10^2 – 10^4S/m) compared to pristine graphite, likely due to poor electrical transport between flakes and from structural disorder. We prepared thin, free-standing CRGO films by reduction of graphene oxide in hydrazine, solution deposition and substrate removal. Film properties are similar to previous reports[1], with DC conductivity ∼1700 S/m, and ordered domain sizes of ∼15nm determined from Raman spectroscopy. THz and IR measurements of 400nm thick films show T ∼0.8 for f <1THz smoothly decreasing to T ∼0.05 at f=100THz, consistent with a ∼70-fold increase in conductivity over this frequency range. We will compare our results to a model of the films as a network of weakly linked conductive particles. Future work will investigate carrier scattering rates and lifetimes in this material.

[1] Sungjin Park, Rodney S. Ruoff. Nature Nanotechnology 2009; **4**: 217.

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