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In-situ Resistive Measurements of Graphite Oxide Reduction for Spin-Transport Based Devices IRA JEWELL, CHIEN-CHIH HUANG, SEAN SMITH, ASHLEY MASON, ALBRECHT JANDER, JOHN CONLEY, Oregon State University — In this work, the thermal reduction to graphene of single and few-layer graphite oxide (GO) was characterized as a function of time using in-situ, four-point resistivity measurements. GO was produced chemically using a modified Hummer's method and then spray deposited onto an oxidized Si wafer. 100 nm Au with a 5 nm Cr adhesion layer was thermally evaporated onto the randomly dispersed GO, and then defined lithographically into an array of four point probe contact structures. High-temperature probes were used to make contact with the samples in a furnace tube where the GO was heated to 300 $^{\circ}$C for 30 minutes under forming gas atmosphere (90% N_2/10% H_2). The measured conductance increased several orders of magnitude as the insulating properties of GO transitioned to the semi-metallic properties of graphene. Graphene and GO were further characterized before and after thermal reduction using atomic force microscopy (AFM) and Raman spectroscopy. We also report on similar experiments using ferromagnetic CoFe contacts for spin-dependent transport experiments.

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