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The epitaxial graphene-graphene oxide junction, a key step towards epitaxial graphene electronics MIKE SPRINKLE, XIAOSONG WU, XUEBIN LI, FAN MING, School of Physics, Georgia Institute of Technology, CLAIRE BERGER, School of Physics, Georgia Institute of Technology, and CNRS - Institut Neel, Grenoble - France, WALT DE HEER, School of Physics, Georgia Institute of Technology — Epitaxial graphene (EG), grown by thermal decomposition of SiC, was lithographically patterned to form pairs of EG electrodes separated by narrow gaps. Graphene oxide (GO) flakes were deposited by an AC dielectrophoresis method to bridge the gaps and produce all-graphene metal-semiconductor-metal structures. Electrical measurements on these devices indicate the presence of Schottky barriers, due to the band gap in GO, at the junctions. The barrier height is found to be between 0.5 eV and 0.7 eV. It is known that annealing graphite oxide reduces the degree of oxidation; annealing these structures at 180 C reduces the barrier height, implying that the band gap can be tuned by changing the degree of oxidation. A lower limit on the mobility of GO is obtained. Recent efforts towards transistor fabrication by chemically oxidizing selected regions of patterned EG will be presented.

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