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Graphene field-effect transistors built with graphene-oxide gate dielectric BRIAN STANDLEY, ANTHONY MENDEZ, California Institute of Technology, EMMA SCHMIDGALL, Imperial College London, MARC BOCKRATH, University of California Riverside — Graphene's high mobility and two dimensional nature make it an attractive material for field-effect transistors. Previous efforts in this area have used bulk materials for the gate dielectric, such as SiO_2 or HfO_2. In contrast, we are investigating the use of an ultra-thin layered material - graphene's insulating analog, graphene oxide. To this end, we have fabricated transistors composed of single or bilayer graphene channels, few-layer graphene oxide gate insulators, and metal top gates. The gates show relatively minimal leakage: less than 0.1 nS/μm^2 at 300K for a few nanometer thick insulator layer, improving with decreasing temperature. We will present our efforts to characterize these devices, including an estimation of graphene oxide's dielectric constant.

Brian Standley
California Institute of Technology

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