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Lithium Intercalation of Few-Layer Graphenes in the 2-Layer Limit SHU YANG FRANK ZHAO, Dept. of Physics, Harvard University, GISELLE A. ELBAZ, Dept. of Chemistry, Columbia University, DMITRI K. EFETOV, Dept. of Physics, MIT, JAYAKANTH RAVICHANDRAN, Dept. of Physics, Harvard University, YINSHENG GUO, LOUIS BRUS, XAVIER ROY, Dept. of Chemistry, Columbia University, PHILIP KIM, Dept. of Physics, Harvard University — Few layer graphene (FLG) intercalate compounds form a new generation of graphene derivative systems where carrier densities are expected to reach 6E14 cm^{-2} per graphene layer, and novel physical phenomena such as superconductivity and magnetism may emerge. Experimental realization of intercalated FLGs have been limited by harsh intercalation processes which are often incompatible with mesoscopic device fabrication techniques. We developed techniques to electrochemically intercalate FLGs down to 2-layers with lithium in-situ in a controlled manner, minimizing sample degradation from parasitic reactions in the electrolyte by passivating sample surfaces using a combination of hBN (over graphene) and photoresist (over metal contacts). By performing simultaneous Raman spectroscopy as the FLGs intercalate, we found that as FLGs reached the 2-layer limit, the Raman signatures of intercalation began to deviate from that of bulk graphite.

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