

Abstract Submitted
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Intercalation and Etching of Graphene by Oxygen and Carbon Monoxide TIANBAI LI, Univ of California - Riverside — Graphene (Gr), a one-atom thick sheet of sp²-bonded carbon, is a fascinating two-dimensional material with unique properties that shows great promise for diverse applications. There is evidence that contaminants attached to Gr can affect the electronic properties, but relatively little is known about how such species adsorb. The experiments performed here involve exposure of O₂ and CO to Gr grown onto Ru(0001) via chemical vapor deposition. The materials are interrogated with a novel application of helium low energy ion scattering (LEIS). It is shown that O₂ and CO both adsorb by intercalating between the Gr and the substrate. The intercalated oxygen desorbs when the sample is annealed to 700 K, which is a lower temperature than it desorbs from clean Ru. It is further shown that some of the carbon in Gr is etched during the desorption, which could affect the quality of Gr-based devices. CO adsorption is studied using isotopically labeled carbon so that LEIS can distinguish it from the Gr. A full layer of intercalated CO is oriented vertically, but the molecules can lie down horizontally underneath the Gr layer when excess CO is removed by annealing.

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