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Measurement of the electronic density of states versus oxygen coverage in oxidized graphene[1] TANESH BANSAL, University of Louisville, ADITYA MOHITE, CHARUDATTA GALANDE, ANCHAL SRIVASTAVA, Rice University, HEMANT SHAH, University of Louisville, PULICKEL AJAYAN, Rice University, BRUCE ALPHENAAR, University of Louisville — The electronic distribution of states for graphene oxide (GO) is thought to vary with oxygen concentration, eventually resulting in the formation of a band-gap. Theory suggests that there are a number of stable oxidative states for GO that produce characteristic electronic state distributions. Here, we describe a direct experimental probe of the GO density of states as a function of oxygen coverage using capacitive photocurrent spectroscopy. The Hummer's method was used to oxidize the graphene samples and standard reduction techniques were followed to vary the oxidation coverage on the samples. Three stable peaks in the density of states were observed across a large range of oxygen concentrations. Evidence for these features was also observed in CVD grown graphene, presumably due to unintentional oxidation. The energy and intensity of the three peaks along with the overall intensity of the photocurrent varies with the oxygen coverage. This information can be used to identify the stable oxidative states, and determine the oxygen coverage of the GO.

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