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The Study of the Origins of Photoluminescence in Graphene Oxide NICHOLAS LOMBARDO, Central Connecticut State University, ANTON NAUMOV, Texas Christian University — In spite of multiple outstanding properties, a novel 2-dimensional nanomaterial, graphene, has now acquired a number of intriguing applications in microelectronics. However, due to its band structure with zero band gap, graphene does not show any optical response, which hampers its use in optoelectronic devices such as solar cells and light-generating devices. This work is directed toward inducing optical response in graphene through controlled oxidation and studying the origins of such optical properties. It has been shown through previous works that ozone-induced transformation of Reduced Graphene Oxide (RGO) to Graphene Oxide (GO) alters the fluorescence signature of this graphene derivative, thus producing a band gap. We applied a controlled oxidation treatment to a water suspension of RGO in order to functionalize the material with oxygen containing groups, yielding GO. After the treatment, a broad fluorescence feature centered at ˜532 nm was measured from the GO. Theoretical PM3 models of GO were then created in order to elucidate the origins of the fluorescence mechanism and suggest if optical properties of GO were caused by confinement effects or defect states at oxygen containing groups.

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