Temperature Programmed Desorption Study of Graphene Oxide
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RODNEY RUOFF, University of Texas — Graphene oxide is an electrical insulator
that shows potential for use in nanoscale electronic devices. An understanding of the
thermal stability of graphene oxide sheets is important since the electrical, chemical,
and mechanical properties of graphene oxide will change as it is reduced at elevated
temperatures. In this study, graphene oxide films were grown by deposition of an
aqueous solution of graphene oxide onto oxygen plasma cleaned silicon nitride on
silicon substrates. The thermal stability of these films was studied by temperature
programmed desorption under ultra-high vacuum conditions up to 350 °C. The
primary decomposition components of the films are H₂O, CO₂ and CO. Desorption of
these components starts at ∼70 °C and is completed by ∼150°C. Coverage dependent
measurements indicate that the desorption kinetics are second order. An activation
ergy of 162 meV for CO₂ desorption has been determined.

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