

Activation of Radical Addition to Graphene by Chemical Hydrogenation.

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Supporting Information

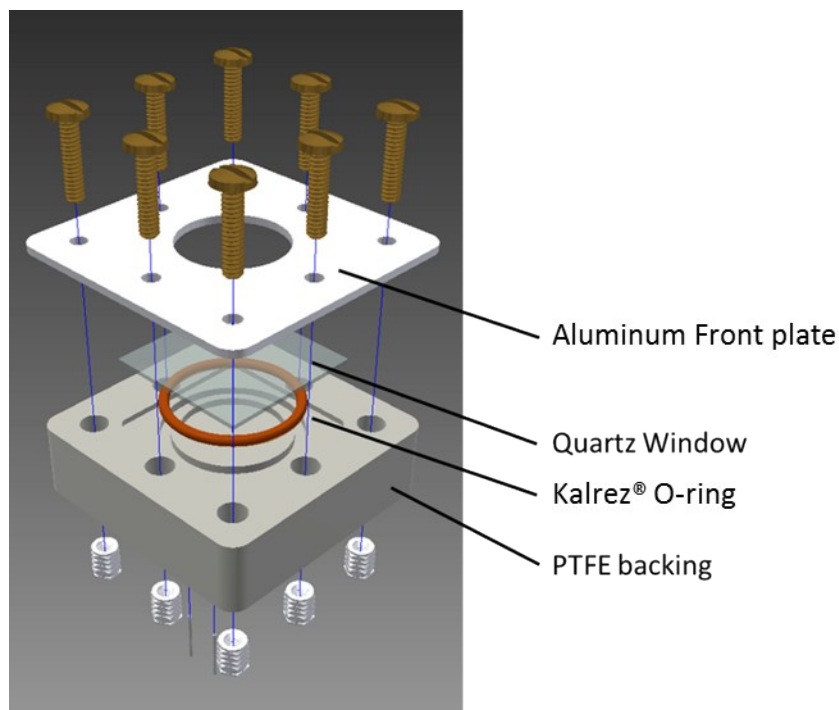


Figure S1. Exploded view of PTFE UV reactor cell. The sample is placed in the circular PTFE chamber and the cell is assembled. The reagents are added via syringe through a small hole in the PTFE backing and sealed with a steel stopper. The UV light is then placed directly above the quartz window.

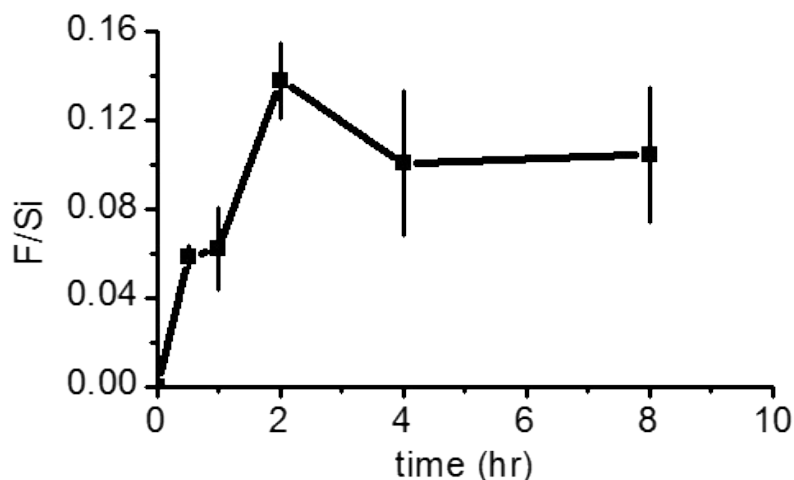


Figure S2. XPS data of atomic ratio of fluorine to silicon (from the underlying wafer) over time showing the increase in fluorine groups on the graphene.

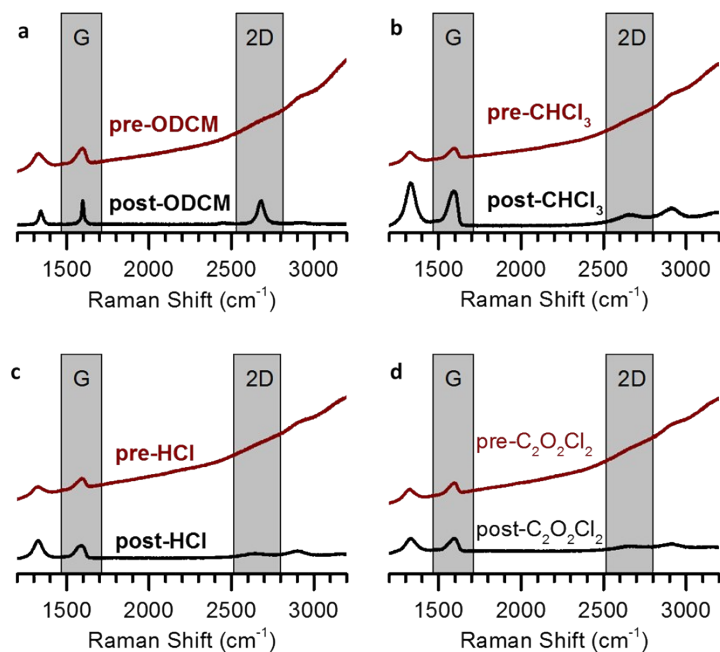


Figure S3. a) Raman spectra of HG before (top) and after (bottom) exposure to ODCM. Note the recovery of the 2D peak intensity relative to the G peak intensity after ODCM exposure. b) Raman spectra of HG before (top) and after (bottom) exposure to neat chloroform. c) Raman spectra of HG before (top) and after (bottom) exposure to HCl gas bubbled through neat dichloromethane. d) Raman spectra of HG before (top) and after (bottom) exposure to neat oxalyl chloride. For b, c, d, note the lack of significant recovery of the 2D peak, indicating that HG remains extensively hydrogenated. The sharply sloping lines of HG before exposure are a result of strong photoluminescence, as indicated in the main text.

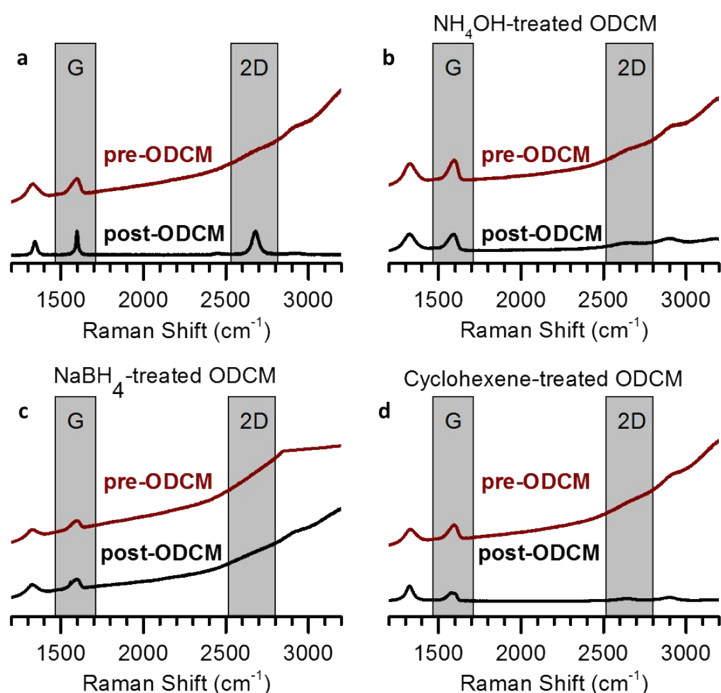


Figure S4. a) Raman spectra of HG before (top) and after (bottom) exposure to ODCM for comparison. Note the recovery of the 2D peak intensity relative to the G peak intensity after ODCM exposure. b) Raman spectra of HG before (top) and after (bottom) exposure to ODCM treated with ammonium hydroxide. c) Raman spectra of HG before (top) and after (bottom) exposure to ODCM treated with sodium borohydride. d) Raman spectra of HG before (top) and after (bottom) exposure to ODCM treated with cyclohexene. For b, c, d, note the lack of significant recovery of the 2D peak, indicating that HG remains extensively hydrogenated. The flat section of c above 2800 cm⁻¹ denotes saturation of the detector in the spectrometer.

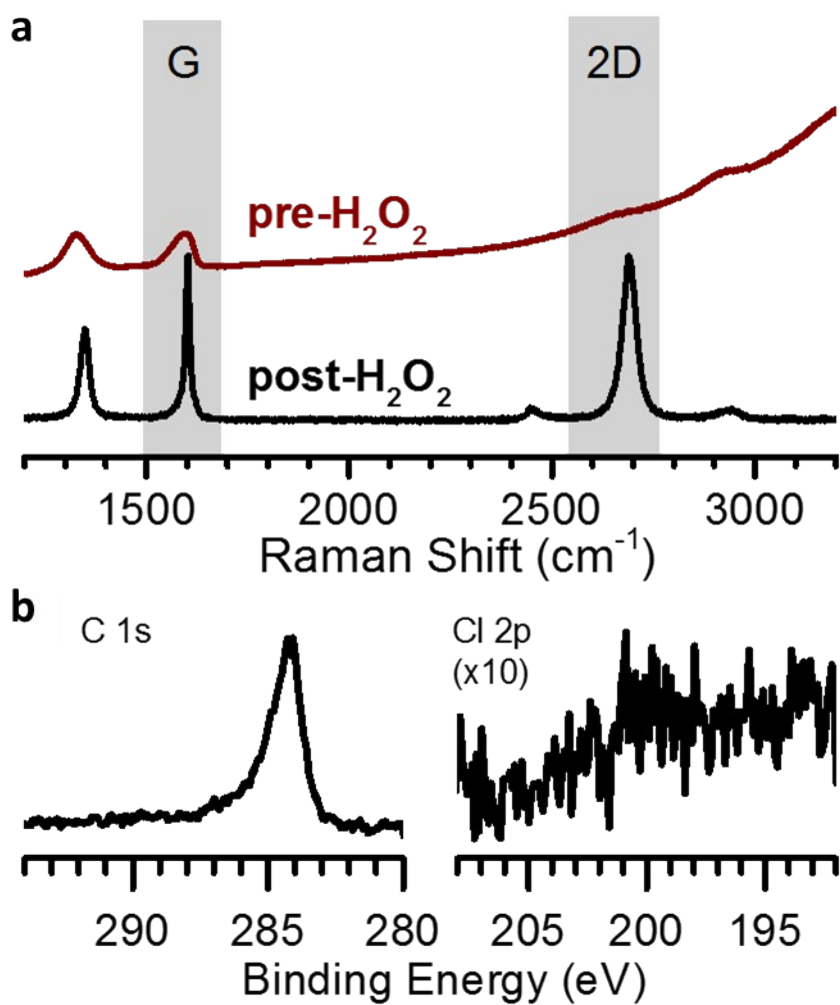


Figure S5. a) Raman spectra of HG before (top) and after (bottom) treatment with 30% aqueous H_2O_2 and 37% aqueous HCl in dichloromethane. b) C 1s and Cl 2p regions of the XPS spectrum of HG treated with 30% aqueous H_2O_2 and 37% aqueous HCl in dichloromethane.

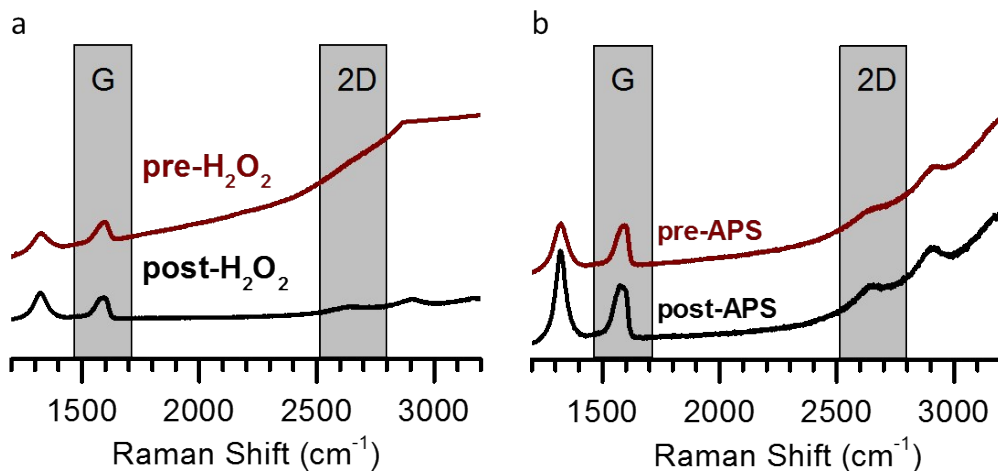


Figure S6. a) Raman spectra of HG before (top) and after (bottom) 1.5 hour exposure to 0.5 mL 30% aqueous H₂O₂ in 9.5 mL ethanol while irradiating with 254 nm UV light. b) Raman spectra of HG before (top) and after (bottom) 15 minute exposure to 10 mg ammonium persulfate in 0.1 mL water and 10 mL dichloromethane.

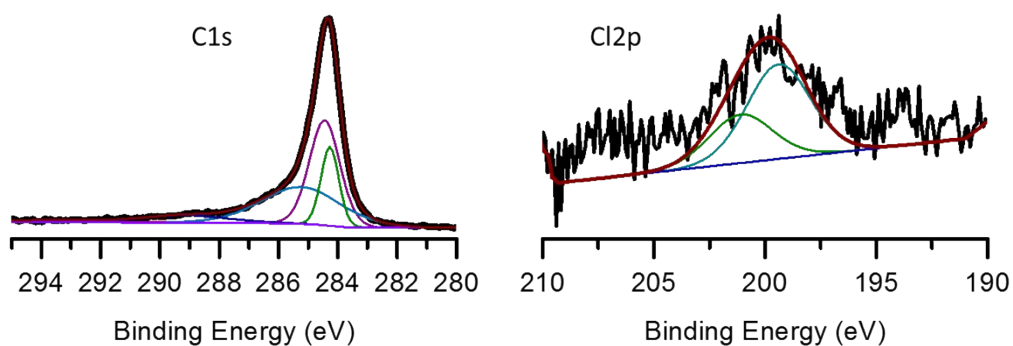


Figure S7. C1s and C12p regions of XPS spectrum for HG reacted with ODCM.

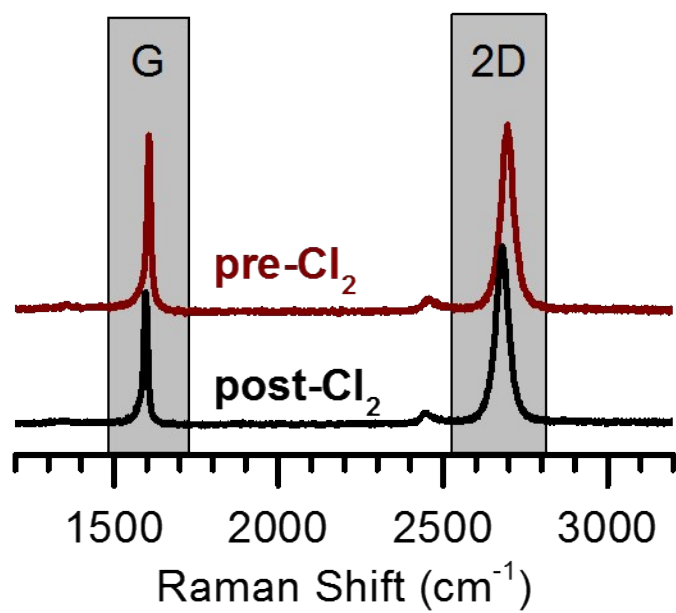


Figure S8. Raman spectra of pristine graphene before (top) and after (bottom) treatment with Cl₂-bubbled dichloromethane.