

Supporting Information for:

Reduction of Graphene Oxide Thin Films by Cobaltocene and Decamethylcobaltocene

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S1. Contents

This document contains supporting information for the manuscript entitled “*Reduction of Graphene Oxide Thin Films by Cobaltocene and Decamethylcobaltocene*”. Section S2 summarizes atomic force microscopy data. Section S3 shows representative energy dispersive x-ray spectra. Section S4 demonstrates the removal of residual cobalt species after reductive treatment by x-ray photoelectron spectroscopy.

S2. Film Thickness Measurements

Atomic force microscopy images of reduced graphene oxide films obtained for the purpose of measuring thicknesses. These films are representative of the samples used for four-point probe resistivity measurements. Three samples of each film type deposited on glass was measured with a four-point probe setup. A corner of each of these samples was then wiped off with a wet Kimwipe and this edge was then imaged by contact mode AFM. The conductivity values for each film type were obtained by averaging each film's thickness and resistivity measurements.

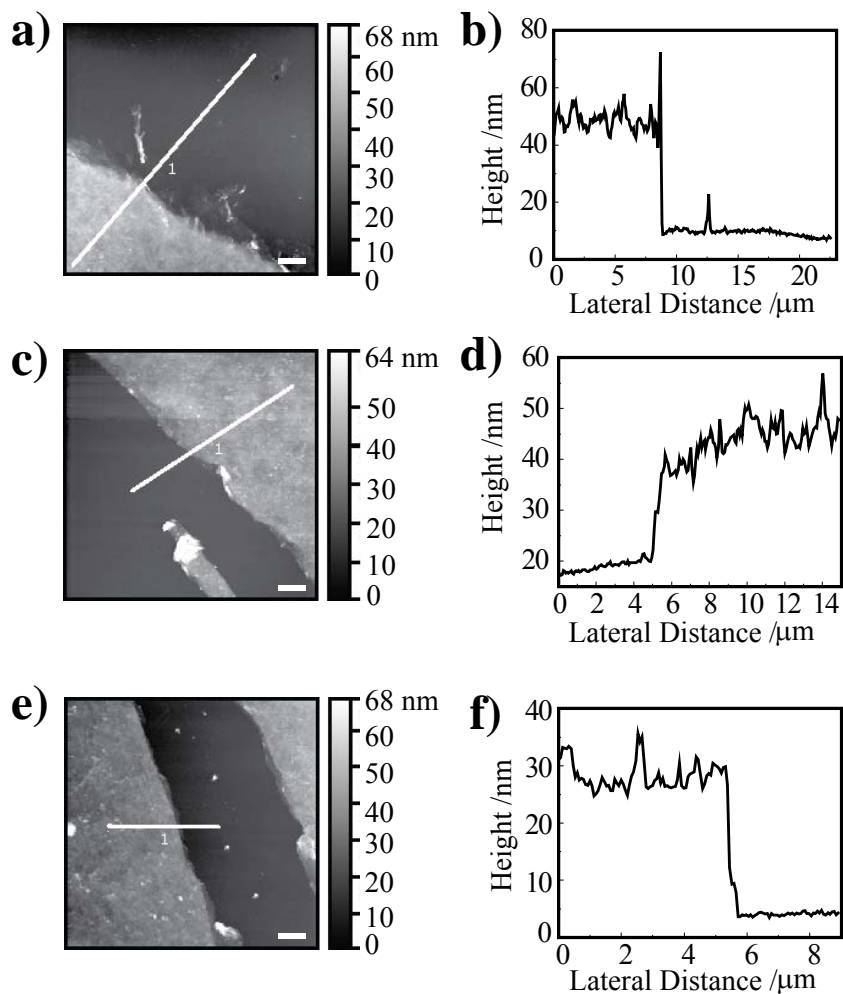


Figure S1. Atomic force microscopy (AFM) images and height profiles of representative GO and RGO films used for four-point probe resistivity measurements. AFM image of (a) a GO film on glass, (c) a GO film treated with cobaltocene TFA on glass, and (e) a GO film treated with decamethylcobaltocene on glass. Height profiles along the lines denoted as 1 are shown in (b), (d) and (f), respectively. Scale bars: 2 μm.

S3. Energy dispersive x-ray spectroscopy

EDS spectra were obtained to identify the elements present in each RGO film type. Films were prepared on silicon wafers. The insets show the respective spectra at a narrower range of energies in order to more easily distinguish individual peaks. Each peak is labeled with its respective element. The silicon peaks originate from the substrate material.

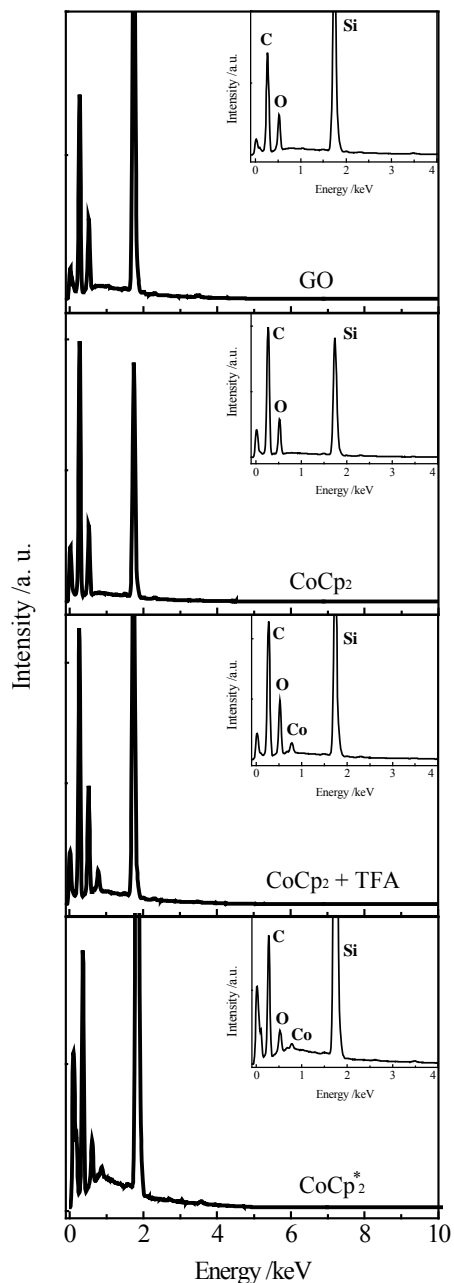


Figure S2. Representative energy dispersive x-ray spectra (EDS) of an as-cast GO film on silicon and after 30 minute immersions in solutions of cobaltocene, cobaltocene & TFA, and decamethylcobaltocene, respectively.

S4. Co 2p x-ray photoelectron spectra

Cobalt 2p XP spectra were taken to confirm the removal of cobalt after soaking in clean solvent. Films were prepared on silicon wafers. RGO films prepared with cobaltocene & TFA were soaked in acetonitrile acidified with TFA for two days. RGO films prepared with decamethylcobaltocene were soaked in neat dichloromethane. No correlation was observed between quantity of initial physisorbed cobalt species and either the reduction method or measured film conductivity.

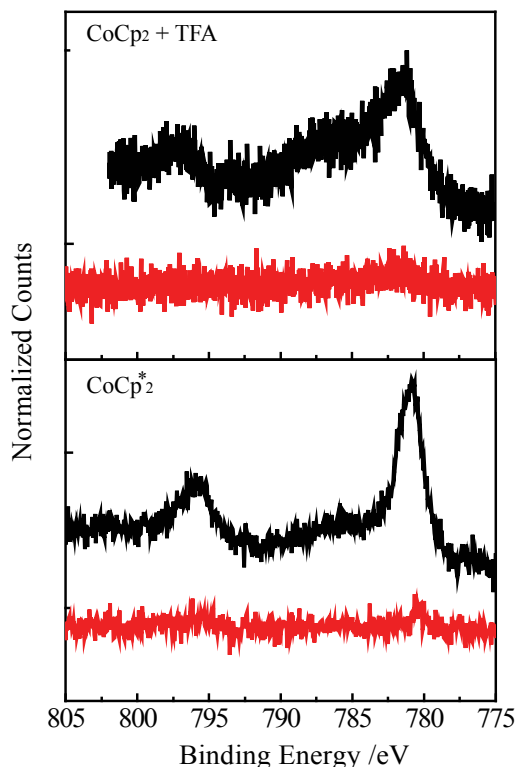


Figure S3. Representative Co 2p XP spectra of RGO films treated with cobaltocene & TFA (top) and films treated with decamethylcobaltocene (bottom). The black lines correspond to freshly prepared RGO films and the red lines correspond to the same films after soaking in neat solvent. The solvents used for this removal of cobalt species was acidified acetonitrile in the case of films treated with cobaltocene & TFA and dichloromethane in the case of films treated with decamethylcobaltocene.