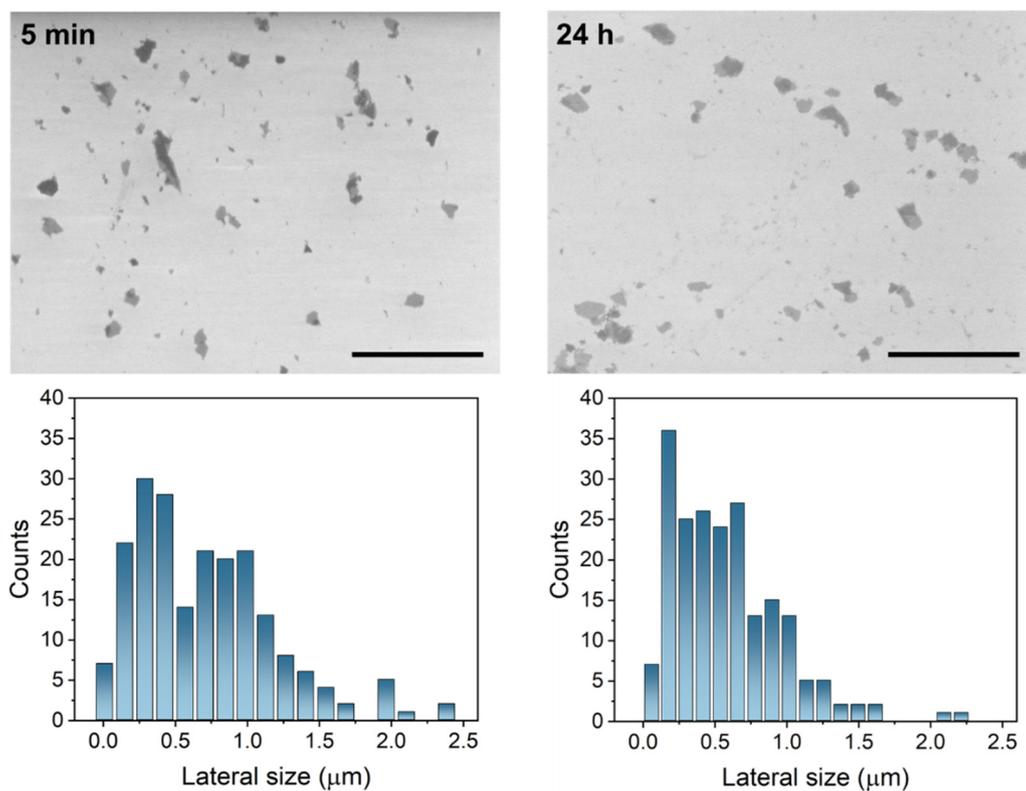
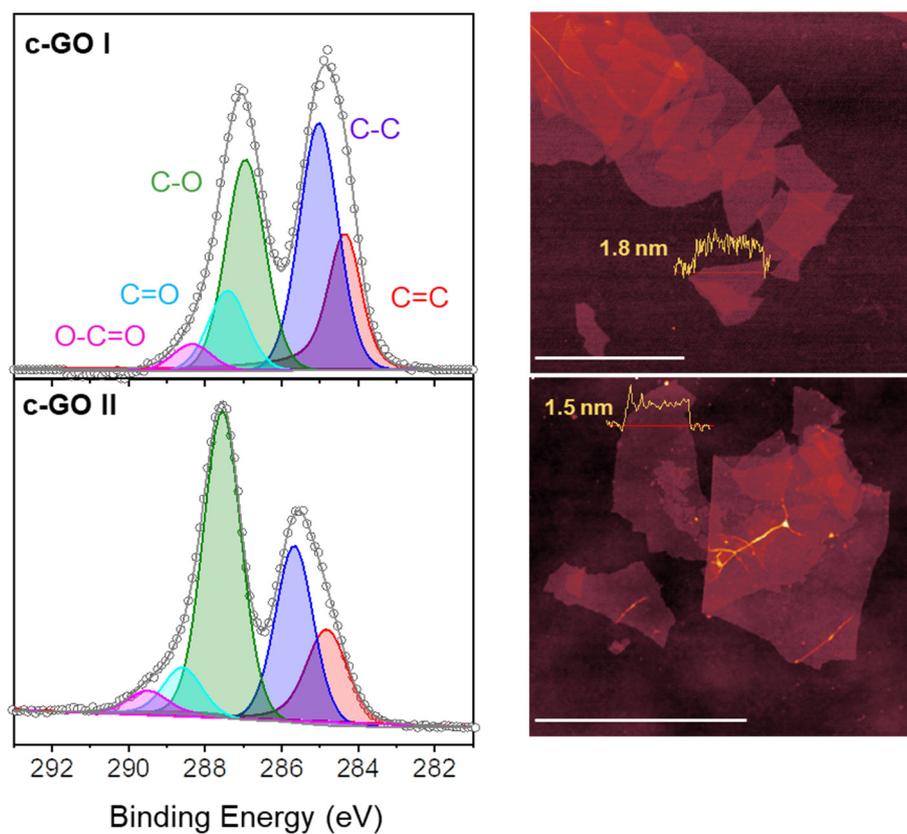


# Supplementary Materials: Accelerated Synthesis of Graphene Oxide from Graphene

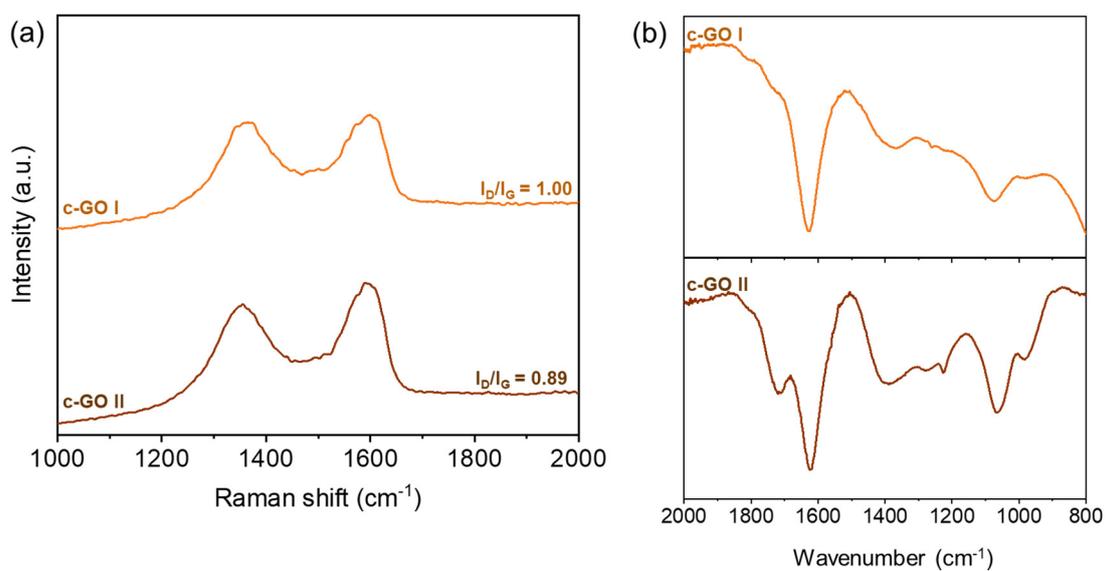
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**Figure S1.** Lateral size distributions for GO flakes after 5 min and 24 h of oxidation.



**Figure S2.** Characterization of commercial GO obtained. High resolution C1s XPS spectra and their respective AFM images. Scales bar are 2  $\mu\text{m}$ .



**Figure S3.** Characterization of commercial GO. (a) Raman, and (b) FTIR spectra.

**Table S1.** Calculated local vibrational modes (LVMs) of oxygen and hydrogen functional groups in graphene. Only vibrational modes with frequencies above 600 cm<sup>-1</sup> and with localization (loc.) on O and H of 2% or larger are shown. Basal plane functional groups were modelled using a supercell model and edge functional groups were modelled using a graphene flake model.

Functional Group	Symbol	Model	O/H-LVMs (cm <sup>-1</sup> )	Loc. (%)
Epoxy	>O	Supercell	1254	2.8
			892	2.3
			801	4.1
			717	3.9
			699	2.0
			696	2.0
			614	4.7
Hydroxyl (surface)	-OH	Supercell	3632	10.0
			1509	2.0
			771–1319	>0
Hydroxyl (edge)	-OH	flake	3575	10.0
			1615	2.1
			1596	2.1
			1382–1488	>2.0
			1109	7.5
			1039	2.4
			814	2.8
			775	2.5
Carbonyl	-COOH		651	2.1
			3508	9.9
			1692	5.4
			1230–1335	>2.0
			1149	6.0
			778–997	>2.0
	671–732	>2.0		