

## Supporting Information

### **Reduction of graphene oxide – a comprehensive electrochemical investigation in alkaline and acidic electrolytes**

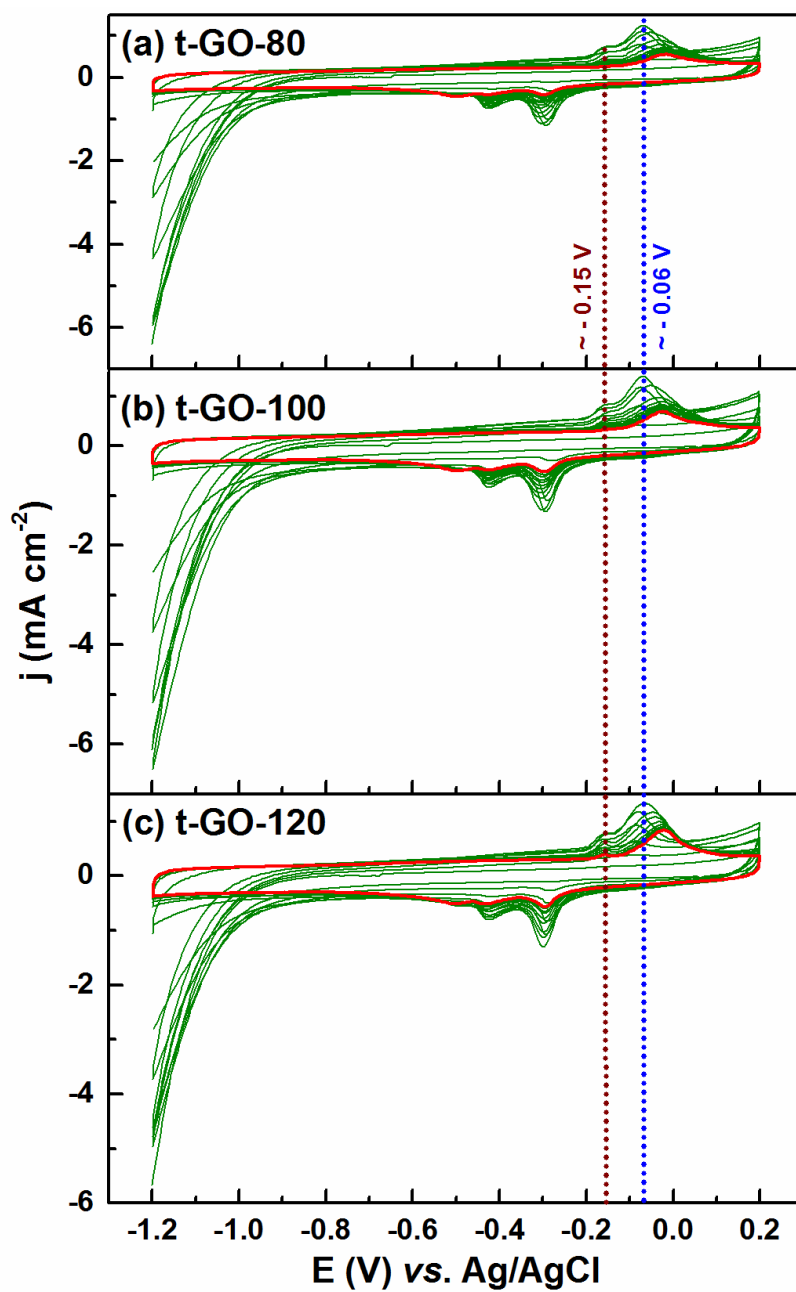
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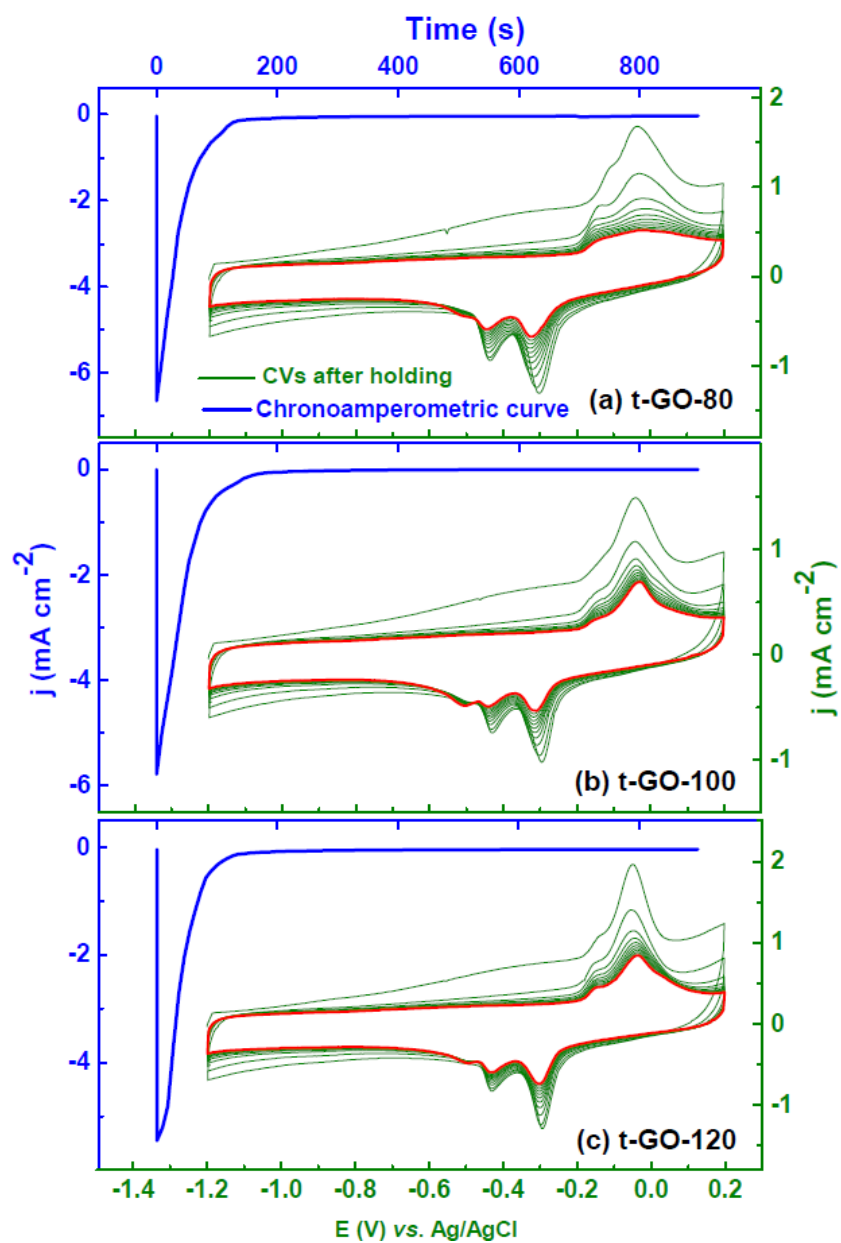
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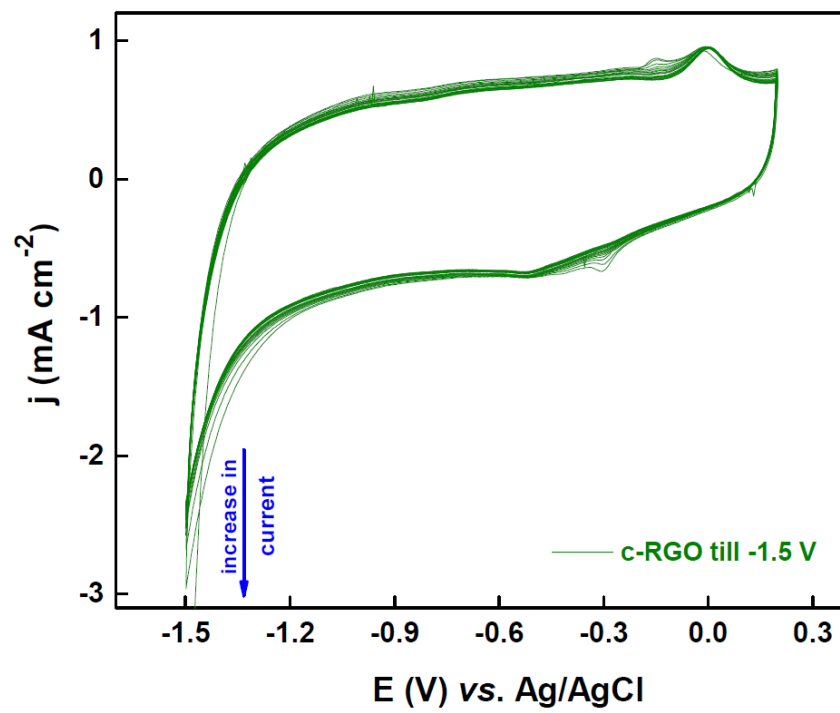
E-mail: [nmanoj@iitb.ac.in](mailto:nmanoj@iitb.ac.in)



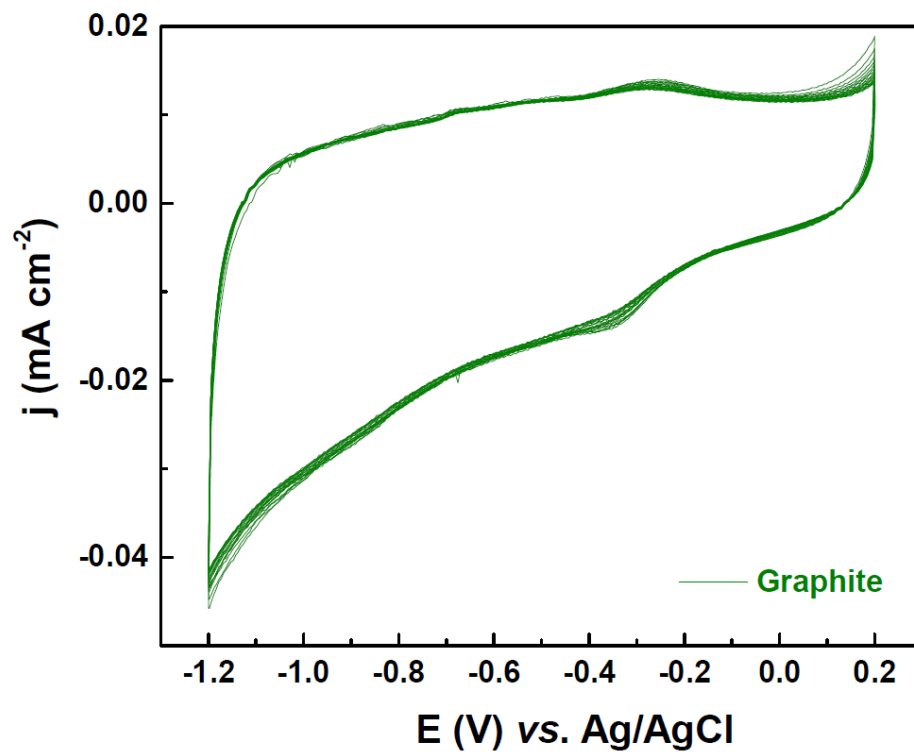
**Fig. S1** CVs of (a) t-GO-80, (b) t-GO-100, and (c) t-GO-120 recorded in argon-saturated 0.1 M KOH electrolyte at a scan rate of 20 mV s<sup>-1</sup>; the initial 5 cycles and thereafter every 5<sup>th</sup> cycle in green lines and the final CV (60<sup>th</sup> cycle) in red line.



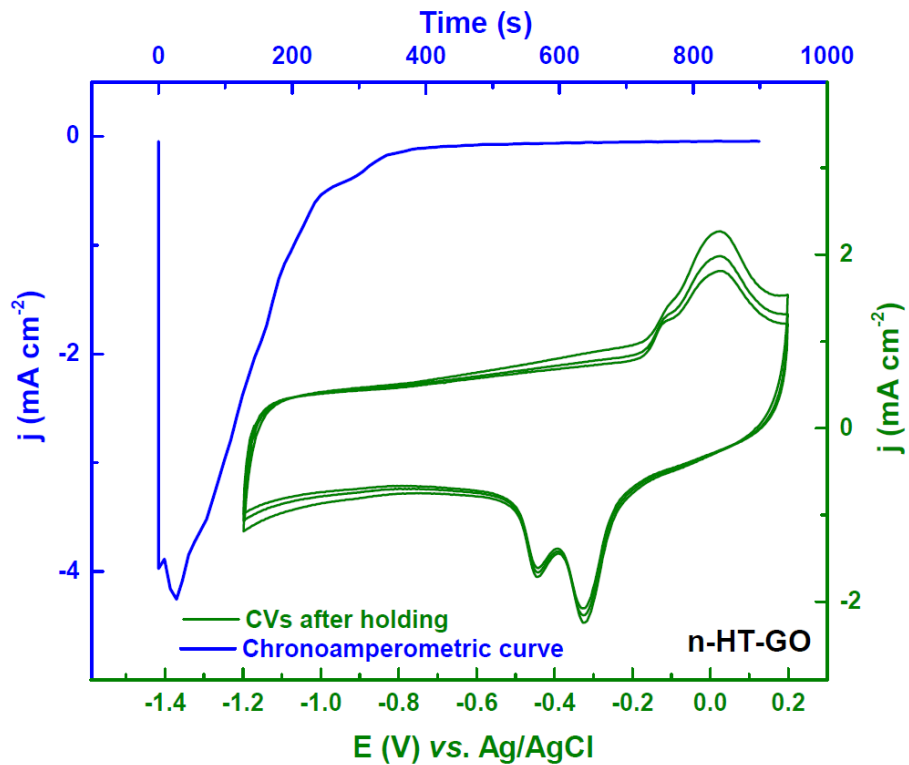
**Fig. S2** Chronoamperometric curve of (a) *t*-GO-80, (b) *t*-GO-100, and (c) *t*-GO-120 recorded at  $-1.2$  V for 15 min. in argon-saturated 0.1 M KOH electrolyte (left and top axes, blue) and the CVs recorded at a scan rate of  $20$  mV s<sup>-1</sup> in the same electrolyte soon after chronoamperometry (bottom and right axes, green); every alternate cycle is shown in green line and the final CV (20<sup>th</sup> cycle) is shown in red line in all the figures.



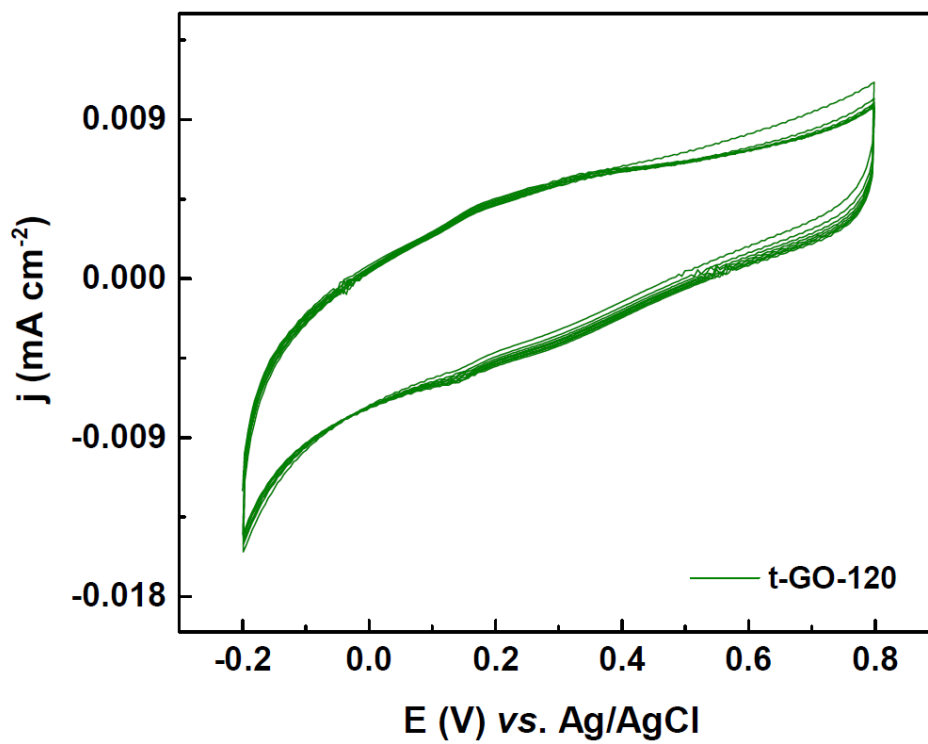
**Fig. S3** CVs (20 cycles) of c-RGO down to  $-1.5$  V in argon-saturated 0.1 M KOH electrolyte at a scan rate of  $20$   $\text{mV s}^{-1}$ .



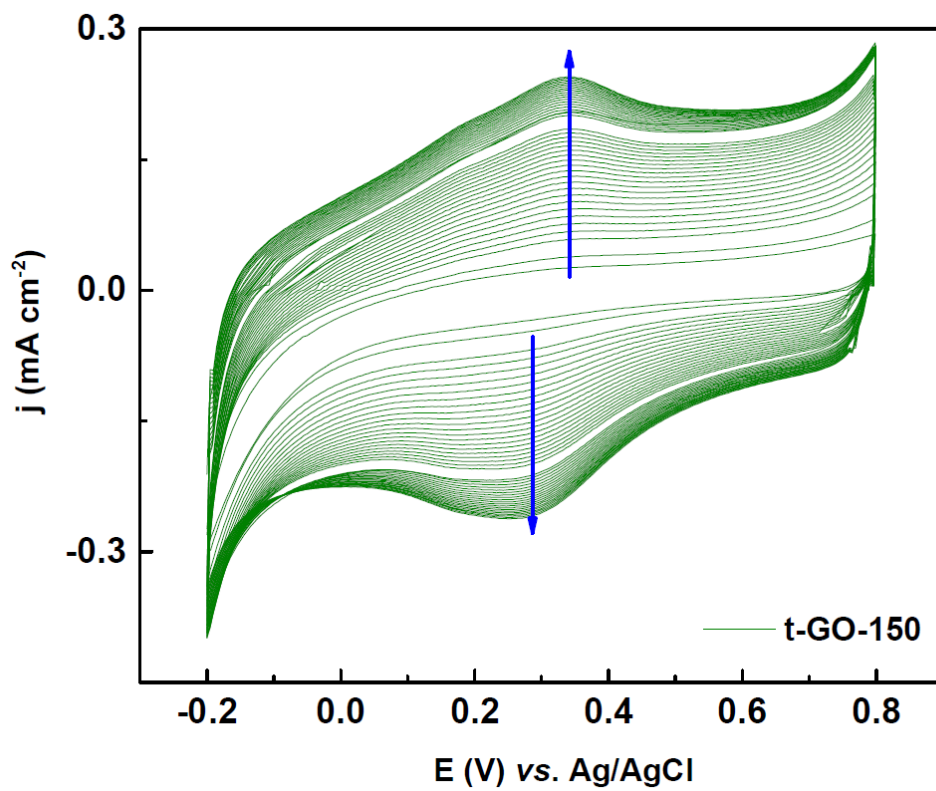
**Fig. S4** CVs of graphite (20 cycles) in argon-saturated 0.1 M KOH electrolyte at a scan rate of  $20 \text{ mV s}^{-1}$ .



**Fig. S5** Chronoamperometric curve of n-HT-GO recorded at  $-1.2$  V for 15 min. in argon-saturated 0.1 M KOH electrolyte (left and top axes, blue) and the CVs (3 cycles, green lines) recorded at a scan rate of  $20$   $\text{mV s}^{-1}$  in the same electrolyte soon after chronoamperometry (bottom and right axes, green).

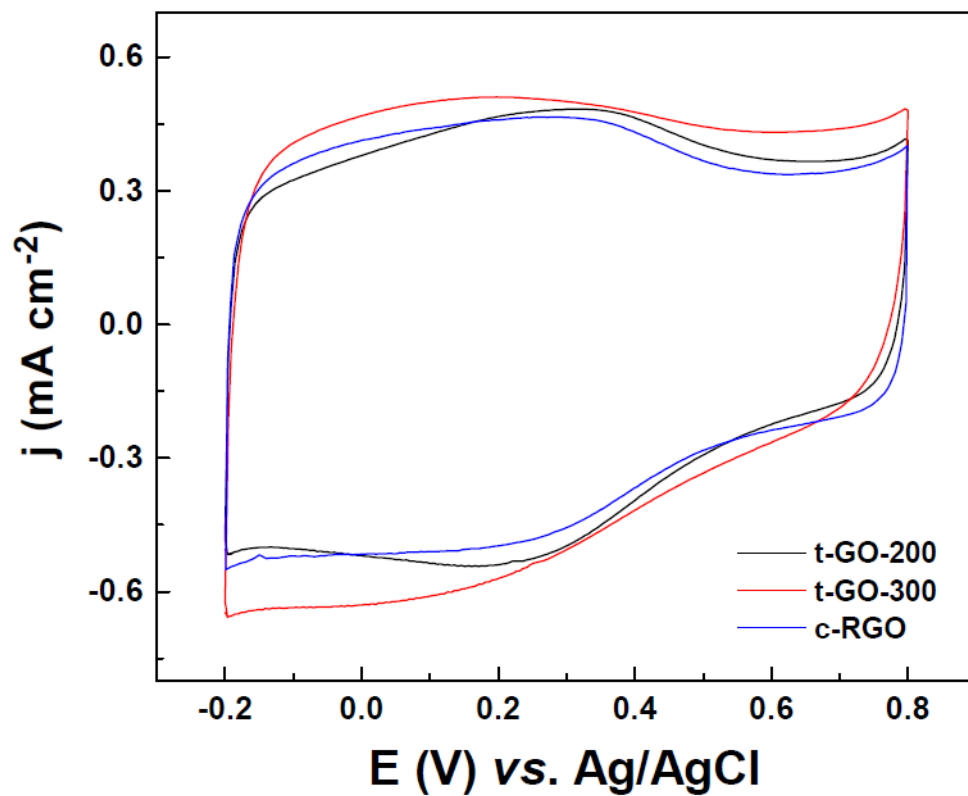


**Fig. S6** CVs (8 cycles) of t-GO-120 recorded in argon-saturated 0.1 M  $\text{HClO}_4$  electrolyte at a scan rate of  $20 \text{ mV s}^{-1}$ .

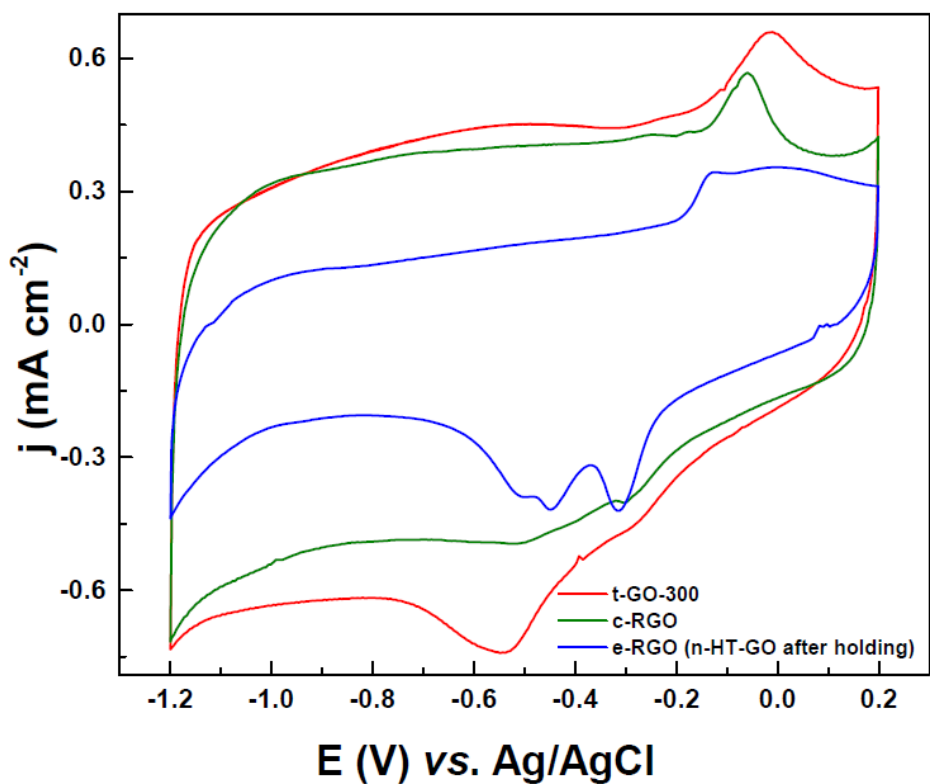


**Fig. S7** CVs (40 cycles) of t-GO-150 recorded in argon-saturated 0.1 M  $\text{HClO}_4$  electrolyte at a scan rate of  $20 \text{ mV s}^{-1}$ .

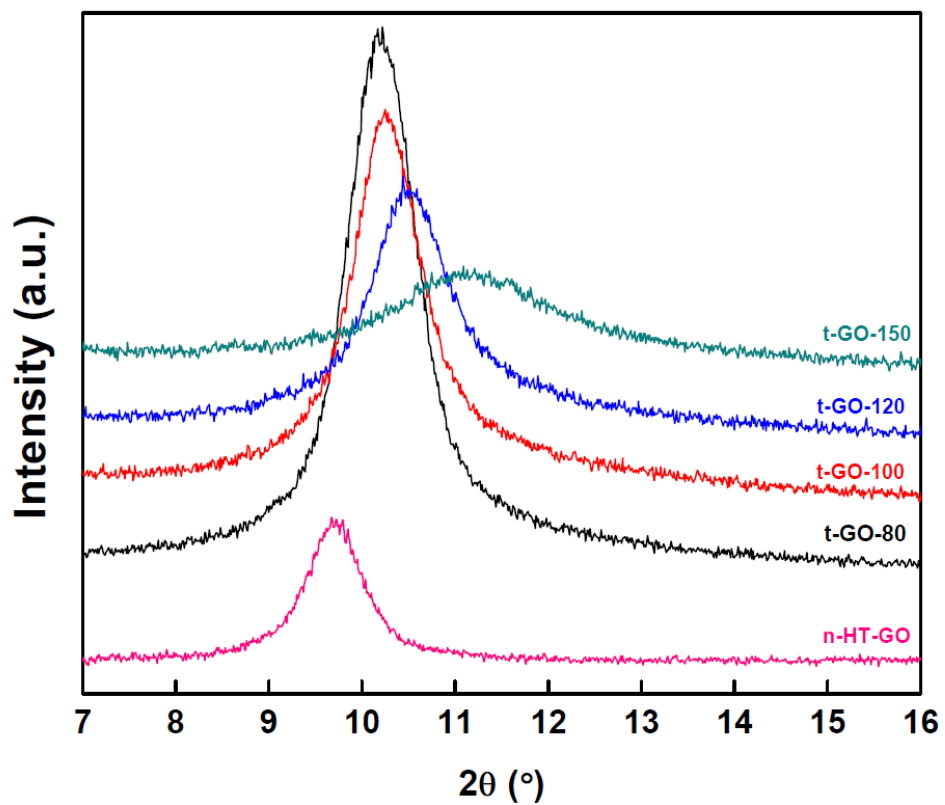




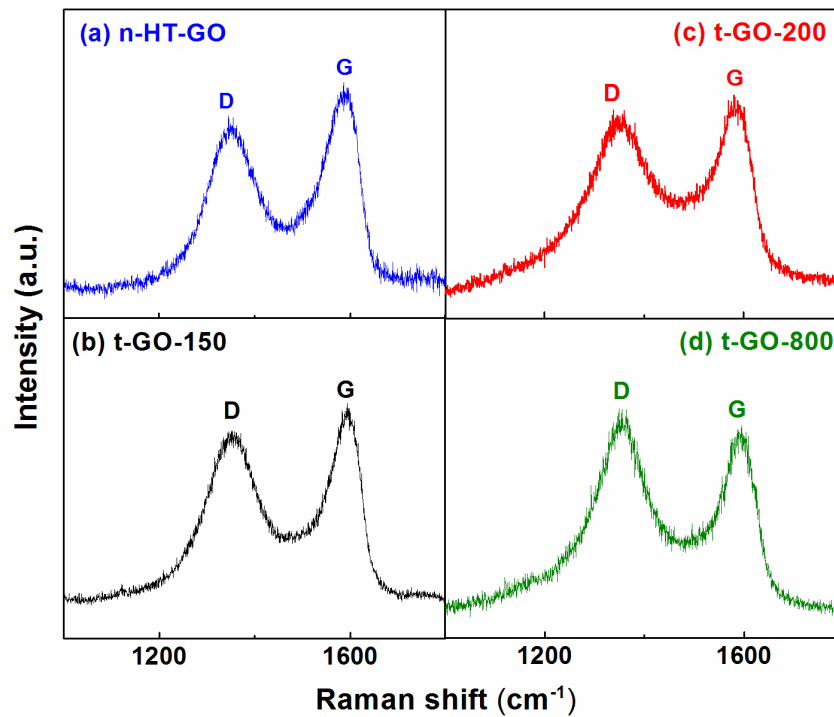
**Fig. S8** CVs of *c*-RGO, *t*-GO-200 and *t*-GO-300 recorded in argon-saturated 0.1 M  $\text{HClO}_4$  electrolyte at a scan rate of  $20 \text{ mV s}^{-1}$ .



**Fig. S9** CVs of e-RGO (10<sup>th</sup> cycle of n-HT-GO after holding), c-RGO and t-GO-300 recorded in argon-saturated 0.1 M KOH electrolyte at a scan rate of 20 mV s<sup>-1</sup>.



*Fig. S10 XRD patterns of the n-HT-GO, t-GO-80, t-GO-100, t-GO-120, and t-GO-150 (magnified view of the encircled region shown in Fig. 12).*



**Fig. S11** Raman spectra of (a) n-HT-GO (b) t-GO-150 (c) t-GO-200 and (d) t-GO-800.

**Table S1.** Specific capacitance of c-RGO and t-GOs

Samples	Alkaline medium (F g <sup>-1</sup> )	Acidic medium (F g <sup>-1</sup> )
t-GO-200	173	168
t-GO-300	177	172
t-GO-400	45	40
t-GO-500	20	18
t-GO-800	13	10
c-RGO	162	158