

## SUPPLEMENTARY INFORMATION

### POLYHYDROXYLATED FEW LAYERS GRAPHENE FOR THE PREPARATION OF FLEXIBLE CONDUCTIVE CARBON PAPER

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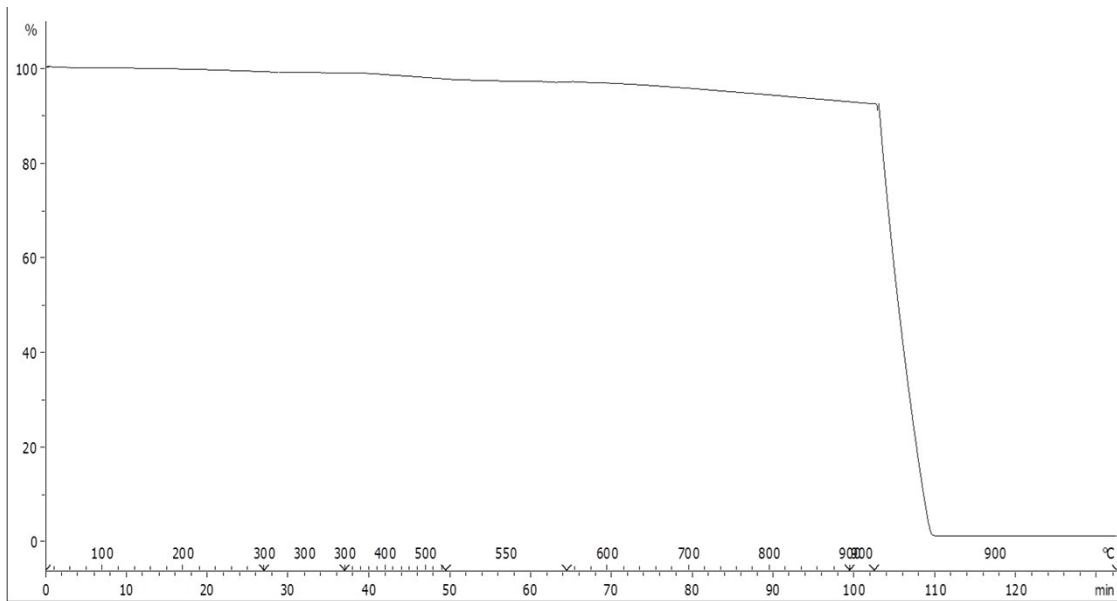
**Table S.1.** Elemental analysis of HSAG and functionalized samples

<b>Adduct</b>	<b>C</b>	<b>H</b>	<b>O</b>	<b>N</b>	<b>Residue</b>
HSAG	95.4	0.4	4.2	/	/
GO	48.5	2.2	36.4	0.2	13.8
G-OH-M	89.1	0.6	6.1	0.2	4.9
G-OH-T	91.0	0.5	5.0	0.2	3.4

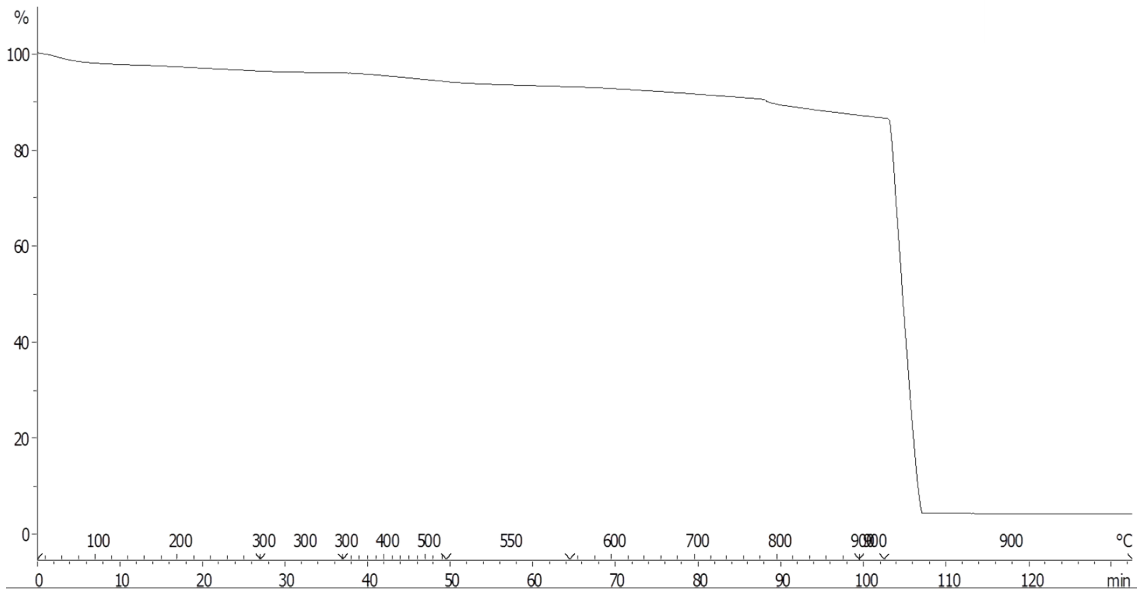
**Table S.2** Mass losses of HSAG and G-OH samples, from TGA analysis

<b>Sample</b>	<b>Mass loss [%]</b>			
	<b>T &lt; 150°C</b>	<b>150°C &lt; T &lt; 700°C</b>	<b>T &gt; 700°C</b>	<b>Residue</b>
<b>HSAG</b>	1.4	1.8	96.8	/
<b>G-OH-T</b>	2.0	2.0	92.5	3.6
<b>G-OH-M</b>	3.0	2.9	90.2	4.1
<b>G-OH-TM</b>	2.9	2.2	91.0	4.0

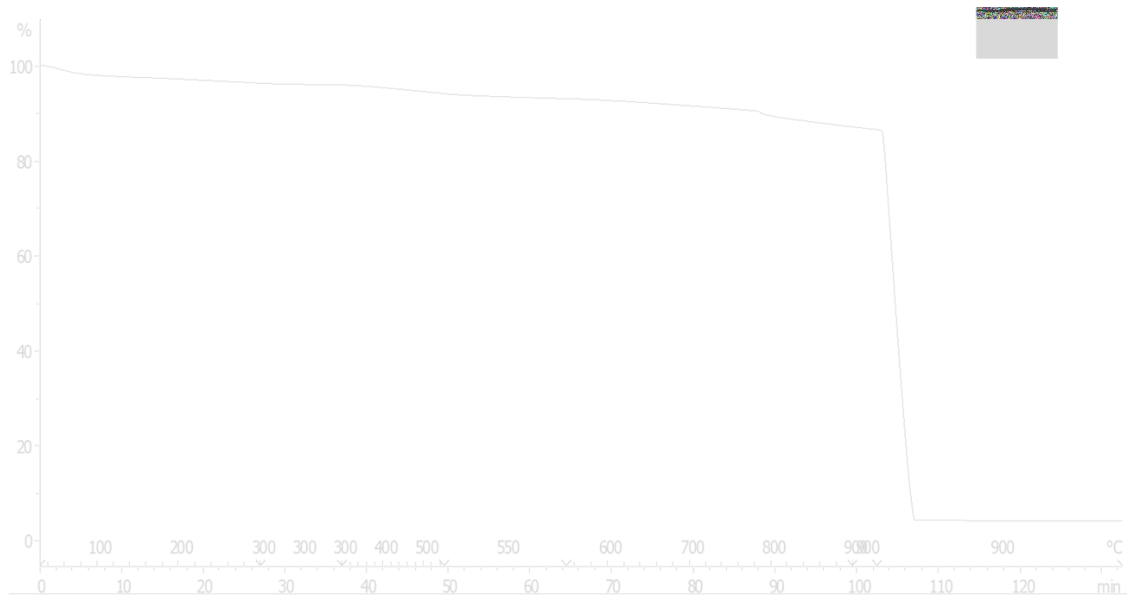
**Figure S.1.** TGA thermograph of pristine HSAG



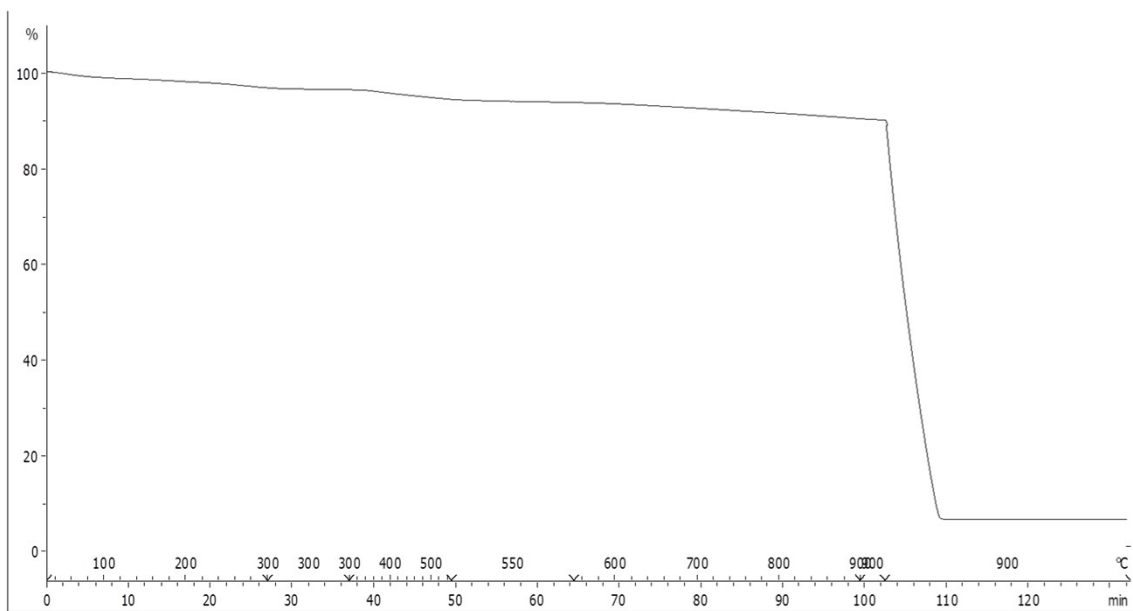
**Figure S.2.** TGA thermograph of pristine G-OH-M



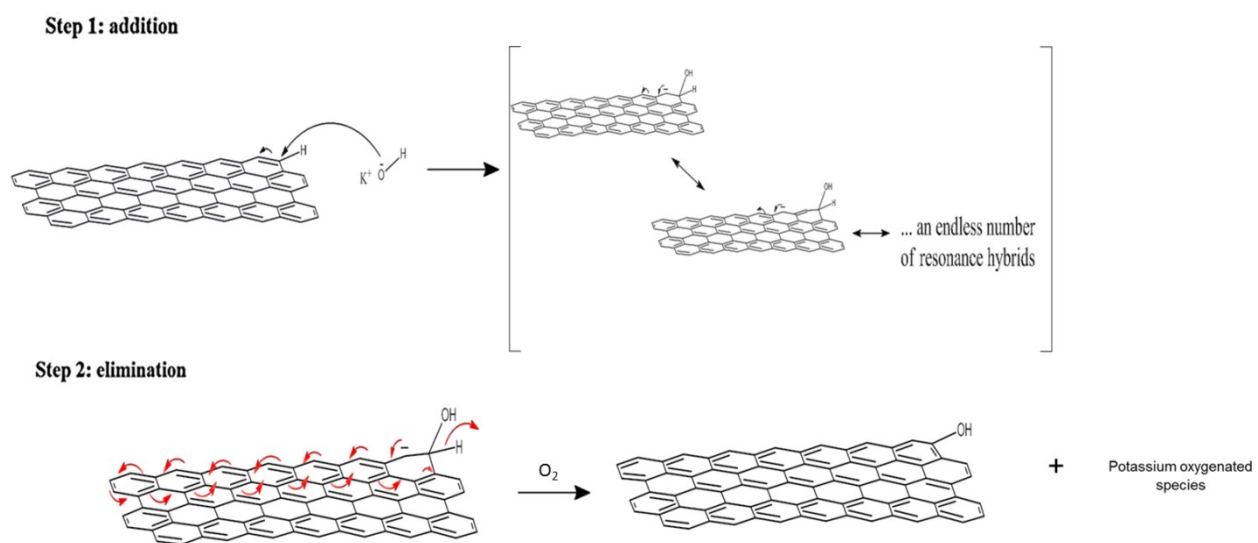
**Figure S.3** TGA thermograph of pristine G-OH-T



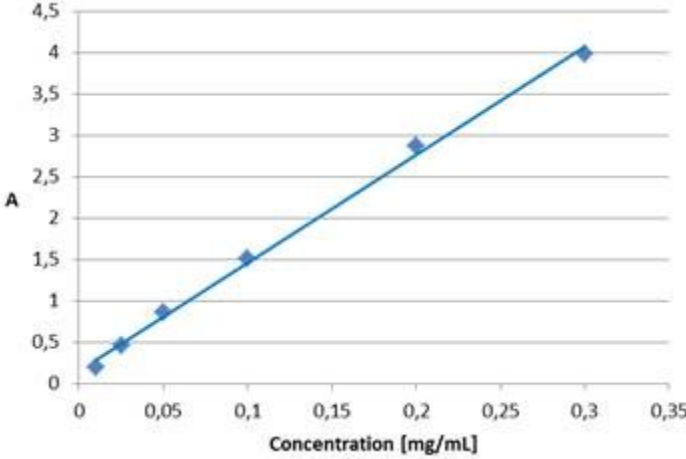
**Figure S.4** TGA thermograph of pristine G-OH-TM



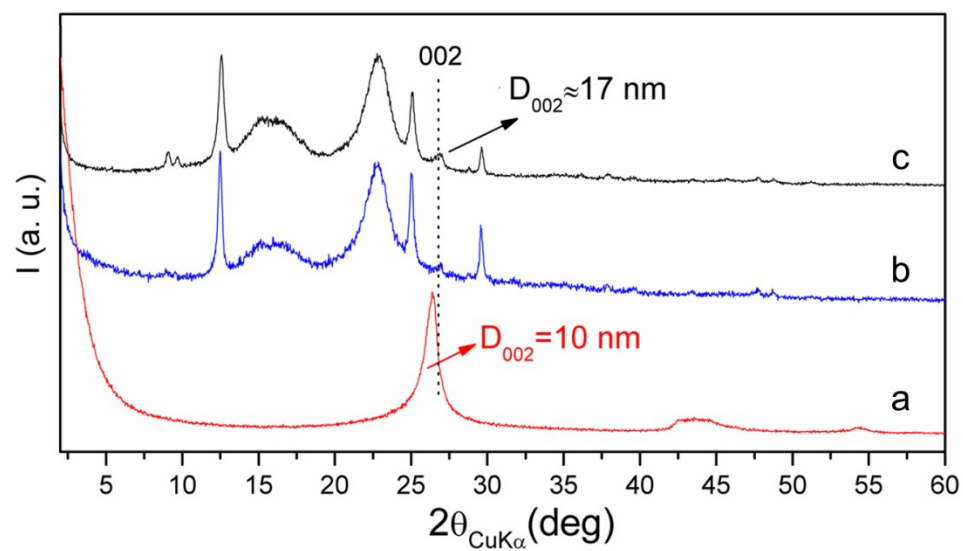
**Figure S.5.** Proposed two step mechanism for the reaction between HSAG and KOH.



**Figure S.6.** Linear relationship between the absorbance at 260 nm and the concentration of water solution of G-OH-TM



**Figure S.7.** WAXD patterns of G-OH-M (a), paper support (b) and carbon paper obtained by depositing G-OH-M water solutions (1 mg/mL, 100  $\mu\text{m}$  bar) (c)



**Figure S.8.** CVs of 0.1 M  $\text{Et}_4\text{NBF}_4/10 \text{ mM K}_4\text{Fe}(\text{CN})_6$  solution (a), 0.125 mM G-OH suspension/0.1 M  $\text{Et}_4\text{NBF}_4$  (b) and 0.1 M  $\text{Et}_4\text{NBF}_4/10 \text{ mM K}_4\text{Fe}(\text{CN})_6$  solution and 0.125 mM G-OH (c)

