

## *(Supporting Information)*

### **Bottom-up synthesis of large-scale graphene oxide nanosheets**

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### **Contents**

Figure S1. The typical digital photographs of as-grown GON samples

Figure S2. The Raman peak assignments of the as-grown GON are compared with the source

Figure S3. The Lorentz fitting of D and G peaks for annealed GON samples

Table S1. The assignments of IR absorptions of source and as-grown GON

Table S2. The assignments of Raman shifts of source and as-grown GON

Table S3. The assignment of Raman peaks for annealed GON samples

Table S4. The Lorentz fitting of *D* and *G* peaks for GON samples Annealed at 700°C and 1300°C

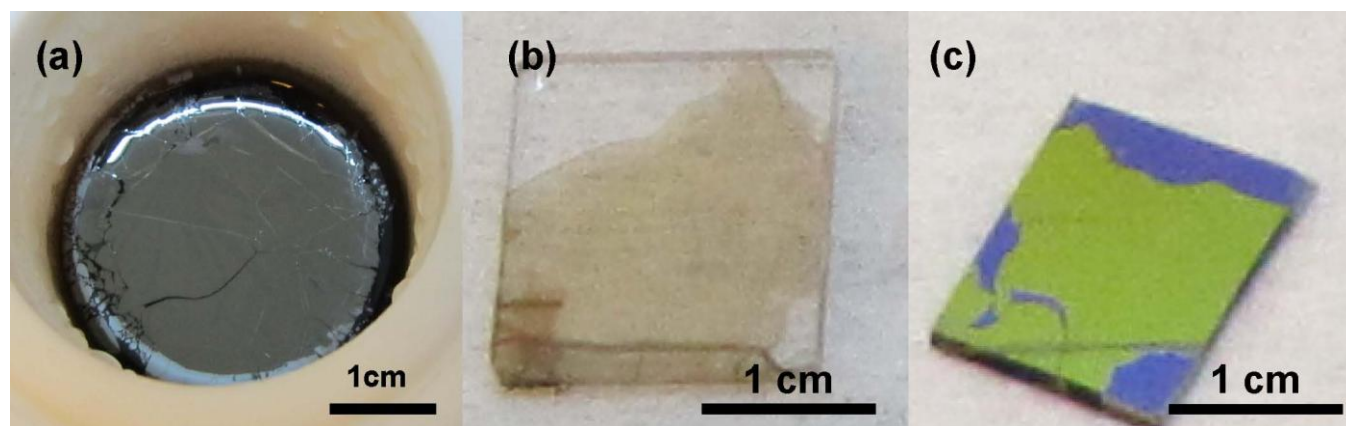
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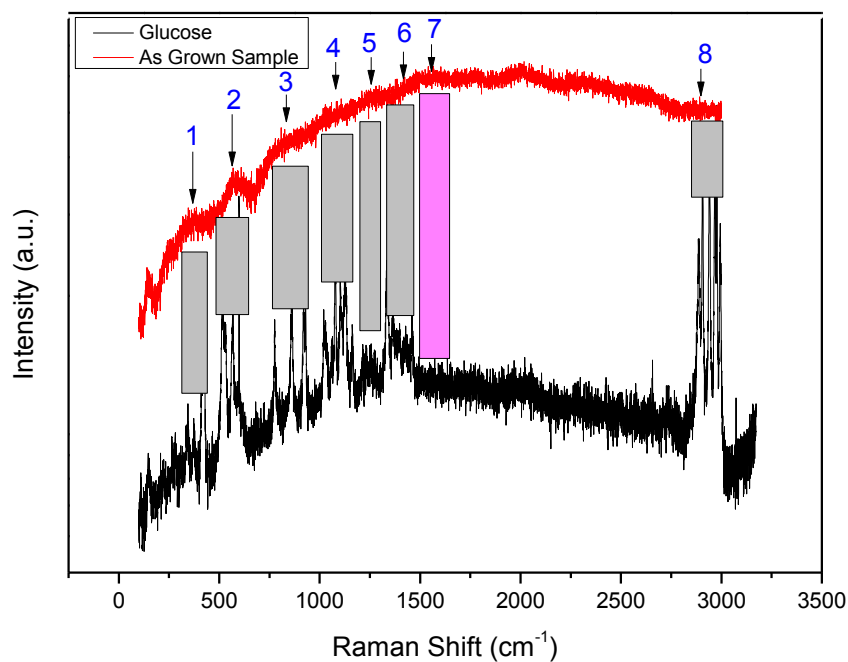
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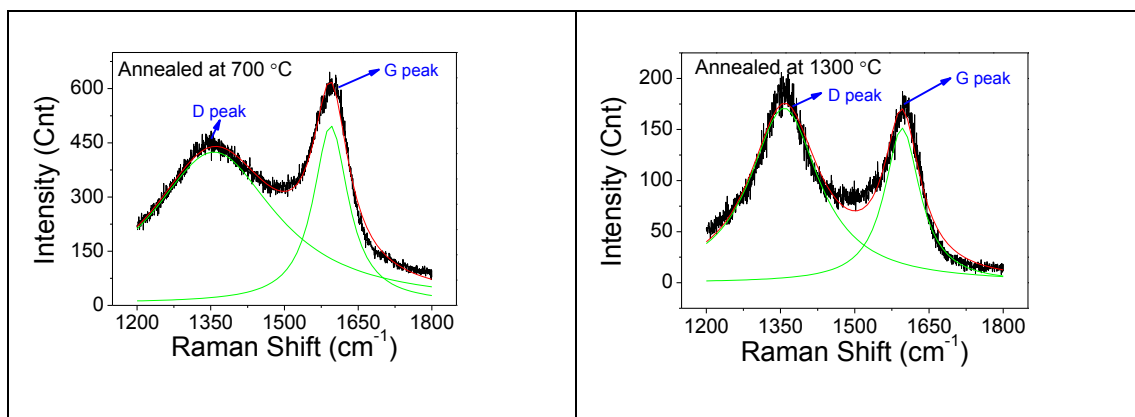
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**Figure S1.** As-grown GON samples. (a) A typical digital photograph of the as-grown GON on the surface of solution with a thickness of 63.6 nm (the lateral size reaches ~3cm). (b) A typical digital photograph of the transferred as-grown GON on quartz substrate. (c) A typical digital photograph of the transferred as-grown GON on SiO<sub>2</sub>(300 nm)/Si substrate.



**Figure S2.** The Raman peak assignments of the as-grown GON are compared with the source. Except for peak 7, all the dispersion peaks of the GON are originated from the source after the polymerization. Peak 7 is related to C=C double bond, which only exists in the as-grown GON rather than in the source.



**Figure S3.** The Lorentz fitting of *D* and *G* peaks for annealed GON samples. The  $A_D/A_G$  ratio decreased from 3.02 (annealed at 700 °C) to 2.20 (annealed at 1300 °C).

**Table S1.** The assignments of IR absorptions of source and as-grown GON (\*)

Source (Glucose)			As-grown GON		
Wavenumber (cm <sup>-1</sup> )	Transmittance (%)	Assignment	Wavenumber (cm <sup>-1</sup> )	Transmittance (%)	Assignment
422.3	22.6	$\beta$ CO, $\delta$ ring, $\tau$ OH	418.5	74.1	$\tau$ OH, $\beta$ CO
513.0	3.3	$\gamma$ CO, $\beta$ CO			
567.0	2.8				
771.4	2.0				
852.4	3.0	$\nu$ ring, rockCH <sub>2</sub> , $\nu$ CO			
916.0	3.4				
925.7	11.7				
1018.2	1.5	$\nu$ CO, $\nu$ ring	1024.0	59.6	$\nu$ CO, $\nu$ ring, $\gamma$ CO
1051.0	1.5	$\nu$ ring, $\nu$ CO, $\beta$ OH			
1072.2	2.8	$\nu$ CO, $\gamma$ CO			
1093.5	2.7	$\nu$ ring, $\nu$ CO			
1110.8	1.9	$\nu$ CO, $\delta$ ring, $\gamma$ CO, $\nu$ ring			
1157.1	1.8				
1209.2	5.3	twCH <sub>2</sub> , $\beta$ OH, $\beta$ CH	1211.1	54.5	$\nu$ CO
1234.2	11.5	$\beta$ OH, $\beta$ CH, $\gamma$ CH			
1249.7	10.2				
1265.1	16.6				
1332.6	4.9	$\beta$ CH, $\gamma$ CH			
1361.5	6.2	$\gamma$ CH, $\beta$ OH, $\beta$ CH, twCH <sub>2</sub>	1363.4	54.7	$\gamma$ CH, $\beta$ OH, $\beta$ CH
1375.0	2.5	$\beta$ CH, $\gamma$ CH, $\beta$ OH	1398.2	53.9	$\gamma$ CH, $\beta$ OH
1429.0	3.5		1621.9	50.5	$\nu$ C=C
1448.3	4.0	sciCH <sub>2</sub>	1666.2	50.7	$\nu$ C=C
2883.1	6.7	$\nu$ sCH <sub>2</sub>	1700.9	49.6	$\nu$ C=O
2902.4	5.5	$\nu$ CH	2925.5	49.1	$\nu$ CH
2937.1	2.9	$\nu$ CH	2969.9	49.3	$\nu$ CH
2962.2	6.1	$\nu$ CH	3401.9	43.1	$\nu$ OH
2971.8	5.2	$\nu$ CH			

\*The abbreviations *s*, *as*,  $\nu$ ,  $\delta$ ,  $\beta$ ,  $\gamma$ , *sci*, *rock*, *tw*, and  $\tau$  mean symmetric, asymmetric, stretch, deformation, bend, wag, scissoring, rock, twist, and torsion, respectively

**Table S2.** The assignments of Raman shifts of source and as-grown GON (\*)

Source (Glucose)			As-grown GON		
Wavenumber (cm <sup>-1</sup> )	Intensity (Cnt)	Assignment	Dispersion Peaks	Peak Wavenumber (cm <sup>-1</sup> )	Intensity (Count)
343.0	103.1	$\tau$ OH	1	360.1	274.7
377.6	101.8	$\tau$ OH, $\gamma$ CO, $\nu$ ring			
425.1	169.0	$\beta$ CO, $\delta$ ring, $\tau$ OH			
517.9	194.0	$\gamma$ CO, $\beta$ CO	2	582.8	340.5
570.0	171.3				
775.8	162.6		3	834.6	416.6
861.5	215.4	$\nu$ ring, rockCH <sub>2</sub> , $\nu$ CO			
918.6	184.3				
930.3	194.7				
1030.5	167.3	$\nu$ CO, $\nu$ ring	4	1067.8	484.0
1062.0	158.5	$\nu$ ring, $\nu$ CO, $\beta$ OH			
1076.5	243.2	$\nu$ CO, $\gamma$ CO			
1104.5	209.8	$\nu$ ring, $\nu$ CO			
1124.3	210.0	$\nu$ CO, $\delta$ ring, $\gamma$ CO, $\nu$ ring			
1163.1	158.1				
1215.6	147.1	<i>tw</i> CH <sub>2</sub> , $\beta$ OH, $\beta$ CH	5	1264.9	524.6
1234.7	148.7	$\beta$ OH, $\beta$ CH, $\gamma$ CH			
1259.1	148.7				
1274.5	146.3				
1333.4	237.7	$\beta$ CH, $\gamma$ CH	6	1395.3	556.2

1363.9	183.6	$\gamma$ CH, $\beta$ OH, $\beta$ CH, <i>tw</i> CH <sub>2</sub>			
1399.7	167.0	$\gamma$ CH, $\beta$ OH			
1380.9	166.4	$\beta$ CH, $\gamma$ CH, $\beta$ OH			
1435.8	159.8				
1461.1	180.2	<i>sci</i> CH <sub>2</sub>			
1521.5	136.2		7	1572.2	590.8
1562.9	132.5				
2888.1	265.7	$\nu$ <i>s</i> CH <sub>2</sub>	8	2918.8	515.9
2906.0	441.3	$\nu$ CH			
2940.6	462.4	$\nu$ CH			
2968.3	383.6	$\nu$ CH			
2978.2	443.7	$\nu$ CH			
2993.6	272.5	$\nu$ <i>as</i> CH <sub>2</sub>			

\* The abbreviations *s*, *as*,  $\nu$ ,  $\delta$ ,  $\beta$ ,  $\gamma$ , *sci*, *rock*, *tw*, and  $\tau$  mean symmetric, asymmetric, stretch, deformation, bend, wag, scissoring, rock, twist, and torsion, respectively.

**Table S3.** The assignment of Raman peaks for annealed GON samples

Annealed at 700 °C	Annealed at 1300 °C	
Raman shift (cm <sup>-1</sup> )	Raman shift (cm <sup>-1</sup> )	Assignment
1357.3	1357.3	<i>D</i>
1595.6	1595.6	<i>G</i>
2669.2	2694.9	<i>2D</i>
2931.9	2928.7	<i>D + G</i>
3178.2	3168.6	<i>2G</i>



**Table S4.** The Lorentz fitting of *D* and *G* peaks for GON samples Annealed at 700°C and 1300°C

Annealed Temperature	Peak	<i>A</i>	$x_c$ (cm <sup>-1</sup> )	$w$ (cm <sup>-1</sup> )	$y_0$	$R^2$	$A_D/A_G$
700°C	<i>D</i>	201906.0	1356.4	307.7	6.594	0.985	3.02
	<i>G</i>	66760.4	1594.3	86.6			
1300°C	<i>D</i>	45385.6	1357.4	169.1	0	0.961	2.20
	<i>G</i>	20680.4	1595.8	87.0			