



Health	0
Flammability	0
Reactivity	1
Personal Protection	E

Technical Data Sheet  
ACS Material Aminated Graphene  
Piperazine covalently linked

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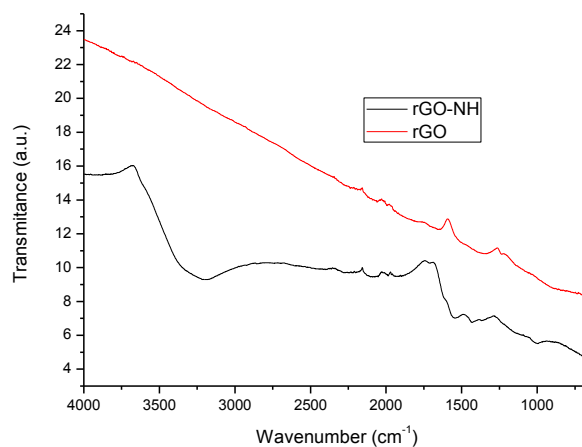
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## 1. Preparation Method

- 1) Prepare Graphene Oxide
- 2) Graphene oxide is modified by Piperazine
- 3) Reduced

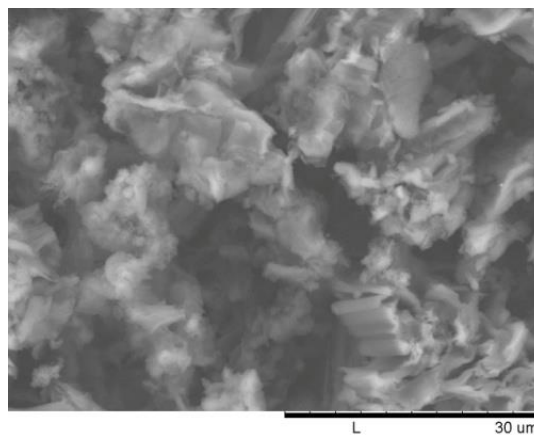
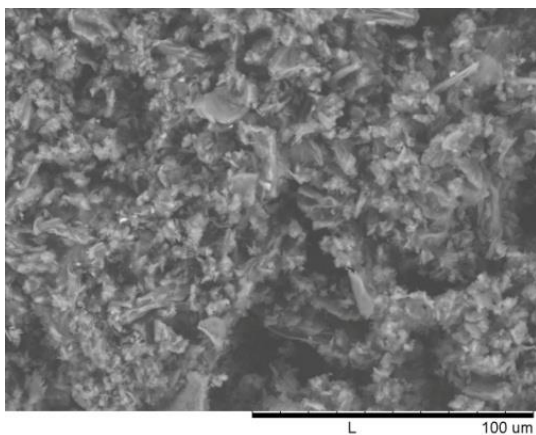
## 2. Characterizations

- FTIR Spectroscopy: Attenuated Total Reflectance (ATR)

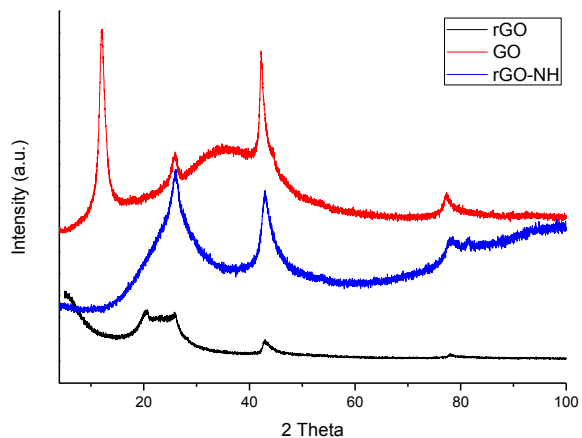


Assignment (cm<sup>-1</sup>): For rGO-NH 1550 (N–H bending), 1433 (C–N stretching).

- Scanning Electron Microscopy



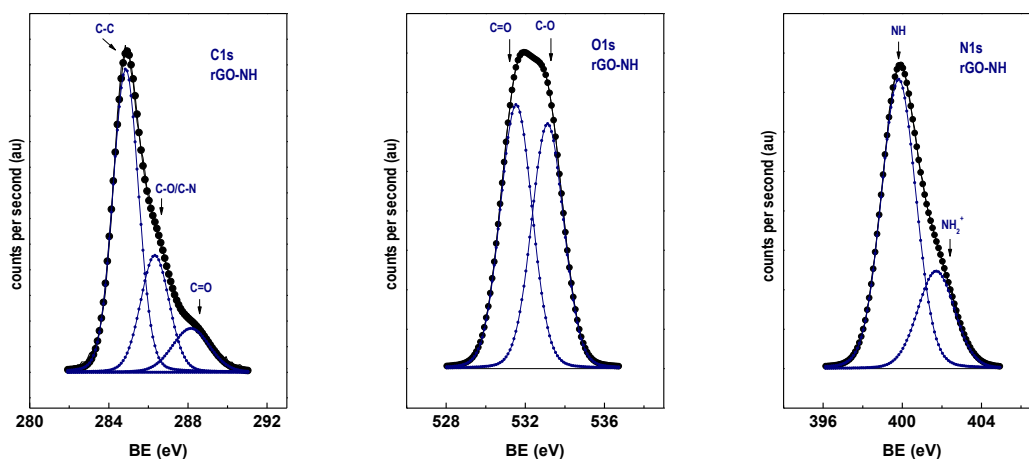
- XRD



XRD pattern of GO, rGO and rGO-NH.

- XPS

	<b>C1s</b>	<b>O1s</b>	<b>N1s</b>	<b>O/C atomic ratio</b>	<b>N/C atomic ratio</b>
GONH	284.8 (57)	531.5 (45)	399.7 (73)	0.202	0.091
	286.3 (31)	532.9 (55)	401.7 (27)		
	288.0 (12)				
rGONH	284.8 (61)	531.5 (52)	399.8 (73)	0.157	0.083
	286.3 (26)	532.9 (48)	401.7 (27)		
	288.1 (13)				
GO	284.8 (38)	531.5 (21)	--	0.655	--
	286.6 (54)	532.7 (79)			
	288.4 (8)				

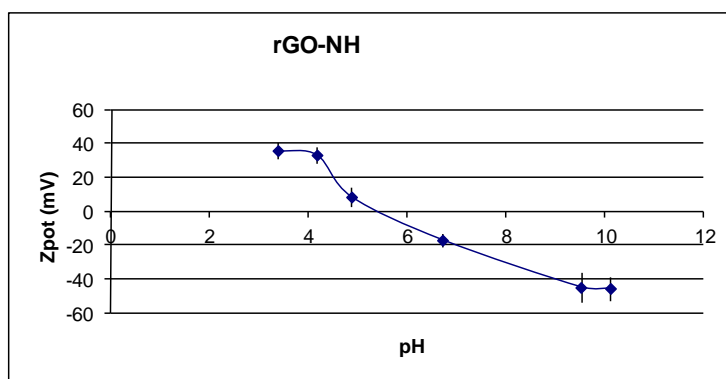


Binding energies (eV) and deconvoluted peaks (%) for C1s, O1s and N1s core levels.

- Elemental analysis

	%C	%H	%N	%S
<b>GO-NH</b>	59.58	3.79	5.33	0.11
<b>rGO-NH</b>	66.58	2.83	5.27	0.05
<b>GO</b>	53.24	2.51	0.04	0.91

- Zeta-potential



Zeta-potential versus pH curve for rGO-NH.

- Amount of NH groups

In order to estimate the amount of NH groups in rGO-NH a reaction with 4-bromobenzyl chloride was performed and the Br amount was quantified by X-ray fluorescence spectroscopy. The value obtained corresponds to 0.13 mmol/g.

- Conductivity

Conductivity of pressed pellets of rGO-NH is 70.75 S/m.

### **3. Application Fields**

Supercapacitors; Catalyst; Solar energy; Graphene semiconductor chips; Conductive graphene film; Graphene computer memory; Biomaterials; Transparent conductive coatings.

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