

Supplementary information

Modified nonwoven with graphene for electromagnetic shielding and infrared Stealth

Javiel Fernández, Olga Martín, Juan Carlos Cabanelas, Javier Pozuelo*

Department of Materials Science and Engineering and Chemical Engineering, IAAB.
University Carlos III of Madrid, 28911 Leganés, Spain

* Javier Pozuelo. E-mail: jpozue@ing.uc3m.es

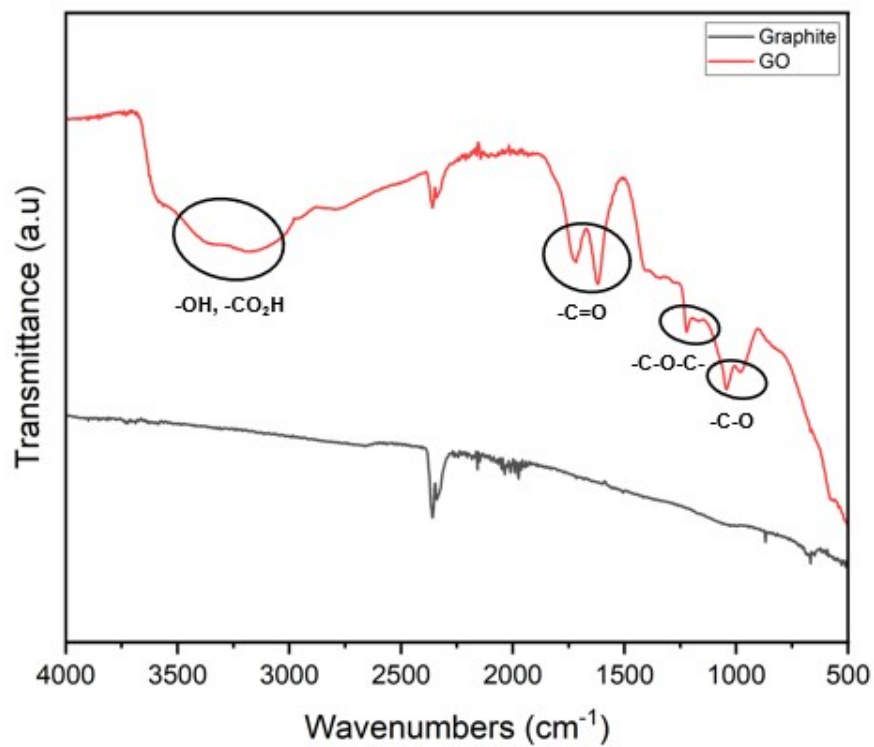


Figure 1S. FT-IR spectra of Graphite (black) and GO (red).

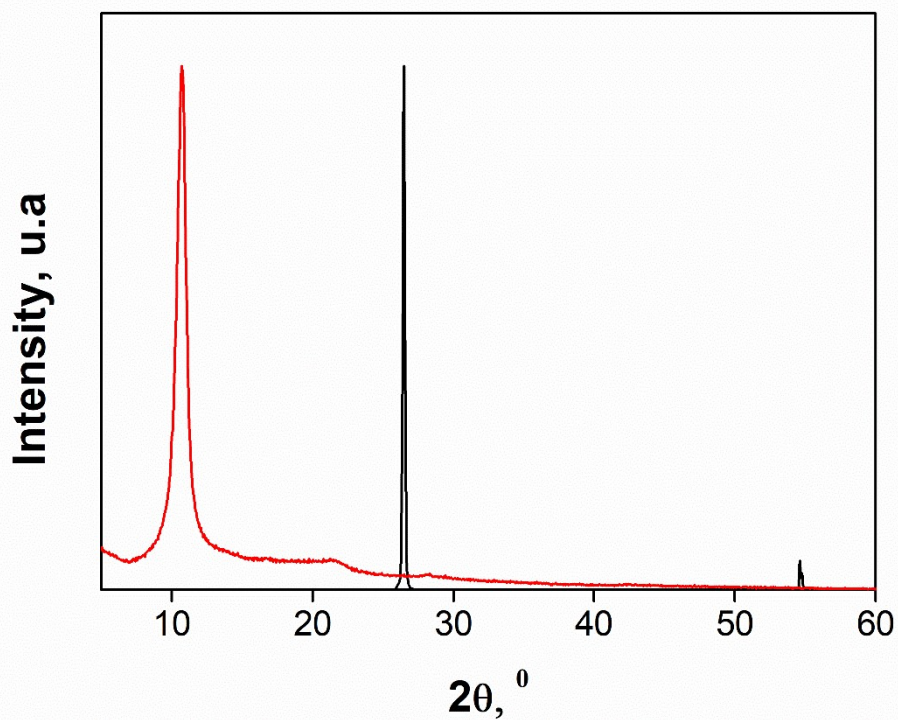











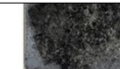






Figure 2S. XRD spectra of Graphite (black) and GO (red).

Reduction Adsorption	Hydrothermal Synthesis – 0 h	Hydrothermal Synthesis – 24 h	Heat treatment 500 °C	Heat treatment 1000 °C
1 adsorption				
2 adsorption				
3 adsorption				
4 adsorption				

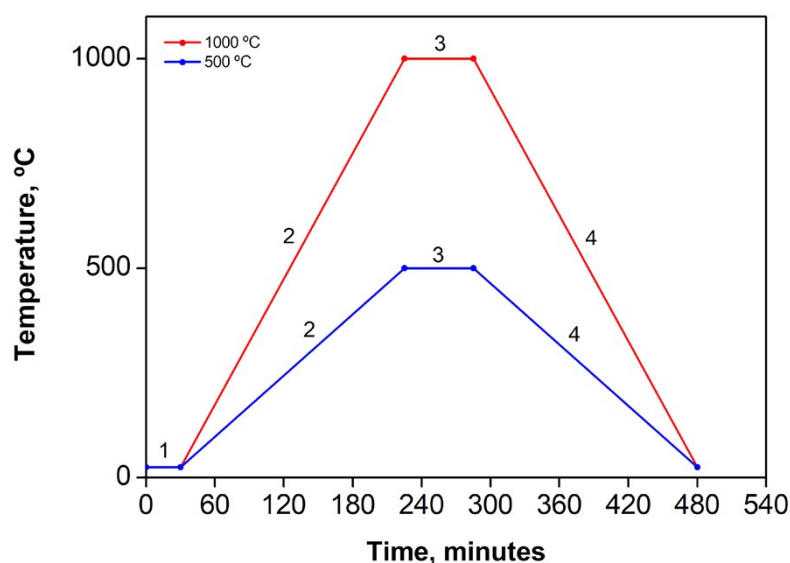


Figure 3S. (up)The aluminosilicate-base ceramic fiber after 1, 2, 3, and 4 GO immersions: column 1 includes the aluminosilicate-base ceramic fiber containing GO without thermal treatment, and columns 2 to 4 include the samples subjected to the different heat treatments, respectively. (down) Temperature ramp schemes used for the highest-temperature treatments at 500 and 1000 °C in the tubular oven: segments 1, 2, and 4: N₂ flow 1.5 L/min; segment 3: N₂/H₂ (95:5) flow 0.6 L/min.

Table 1S. Weight gain of nonwovens after heat treatment

Weight gain, % Treatment	GO absorptions			
	1	2	3	4
hydrothermal	0.5	1.3	2,9	3.4
500 °C	0.4	1.1	2,7	3.1
1000 °C	0.2	1,0	2.0	2.7

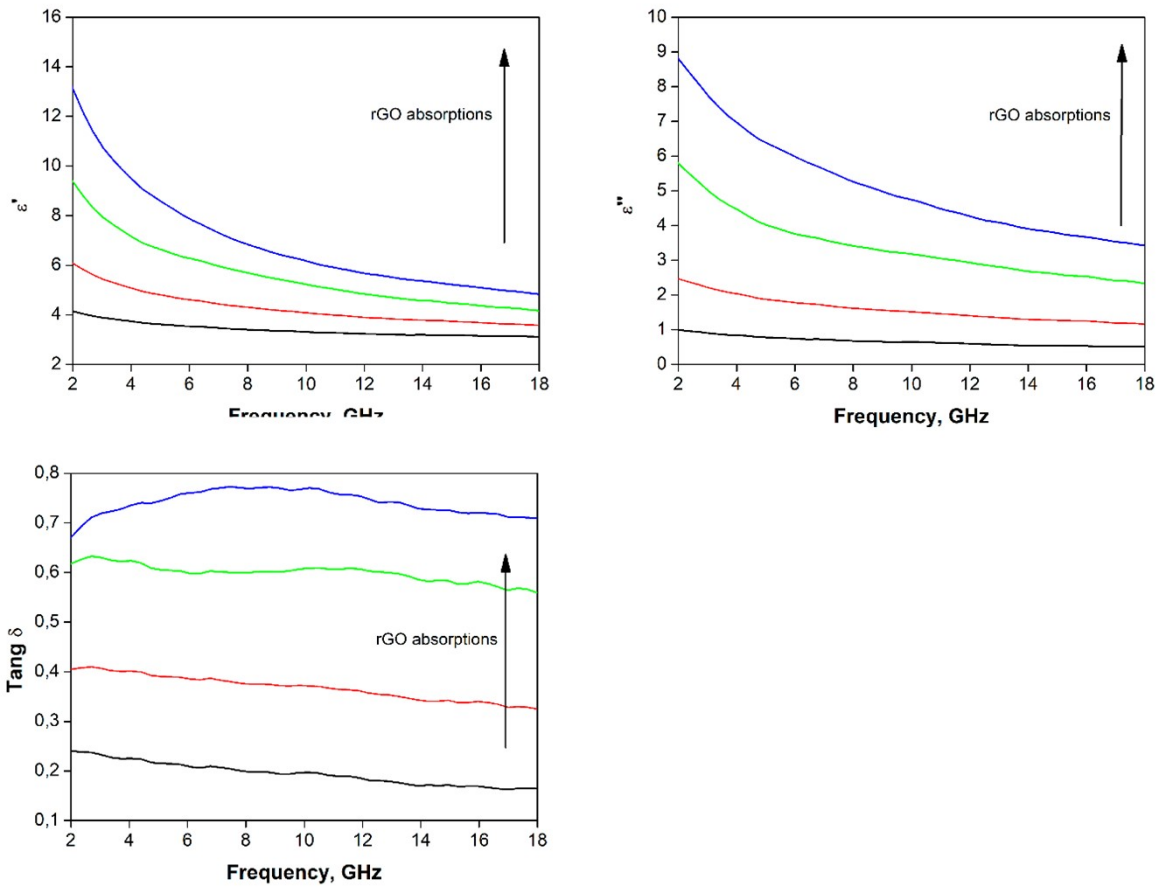


Figure 4S. The aluminosilicate-base ceramic fiber after 1, 2, 3, and 4 GO immersions, with a temperature treatments of 1000 °C,

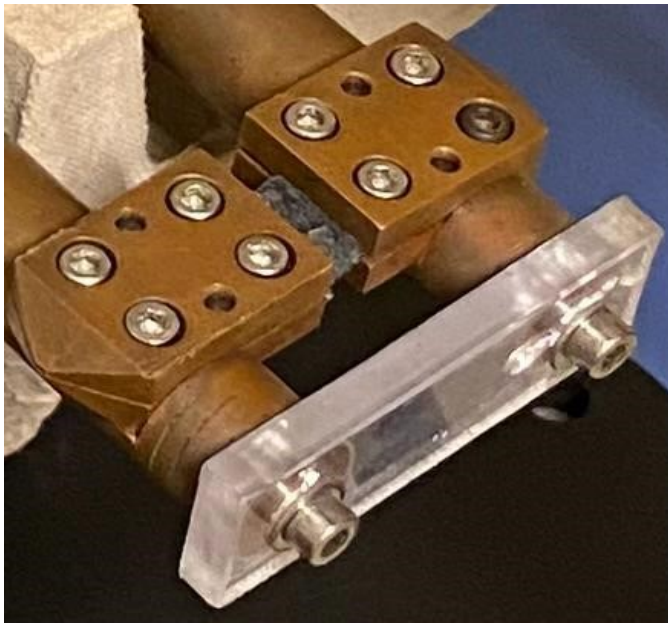


Figure 5S. Image of the cell employed to support the samples and to assess the Joule-Heating and heat resistance.

Video 1. Thermal shielding 50.mp4

Thermal shielding behavior of reduced graphene oxide nonwoven composites containing 4 GO adsorptions, respectively, and heat treatment at 1000 °C to 50 °C of the plate temperature.

Video 2. Thermal shielding 150.mp4

Thermal shielding behavior of reduced graphene oxide nonwoven composites containing 4 GO adsorptions, respectively, and heat treatment at 1000 °C to 150 °C of the plate temperature.

Video 3. Thermal shielding 200.mp4

Thermal shielding behavior of reduced graphene oxide nonwoven composites containing 4 GO adsorptions, respectively, and heat treatment at 1000 °C to 200 °C of the plate temperature.

Video 4. Joule-heating 1000_6V.mp4

Joule-heating of reduced graphene oxide nonwoven composites containing 4 GO adsorptions, and heat treatment at 1000 °C. Applying cycles of 6 V.