Electronic Supplementary Material (ESI)

Lateral size reduction of graphene oxide preserving its electronic properties and chemical functionality

Ulises A. Méndez-Romero[a,b,c], Sergio Alfonso Pérez-García[a,c*], Qunping Fan[b], Ergang Wang[b*], Liliana Licea-Jiménez[a,c*].

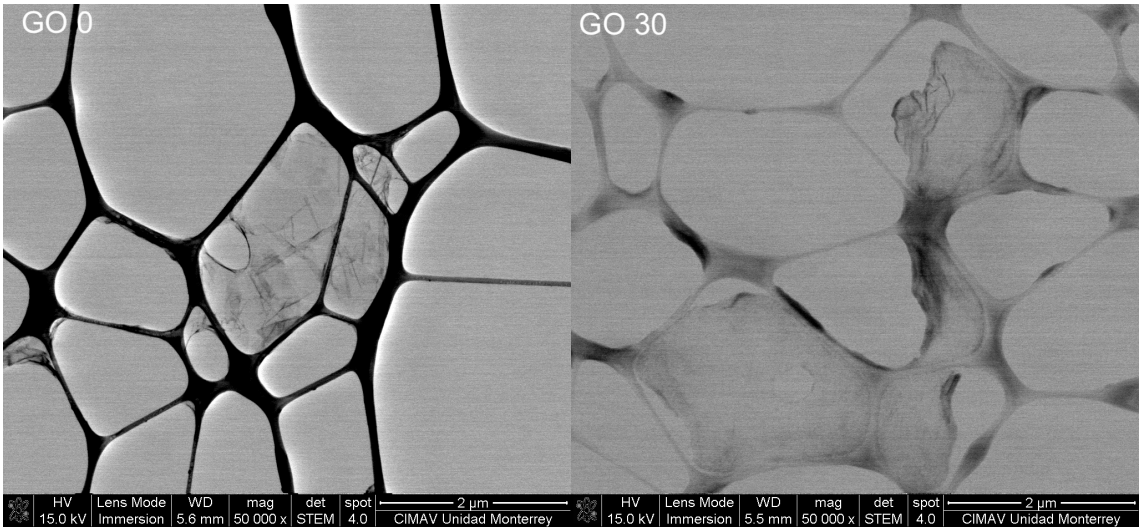
[a] *Centro de Investigación en Materiales Avanzados S.C., Unidad Monterrey, Alianza Norte No. 202, PIIT, Apodaca, N.L. CP 66628, México*

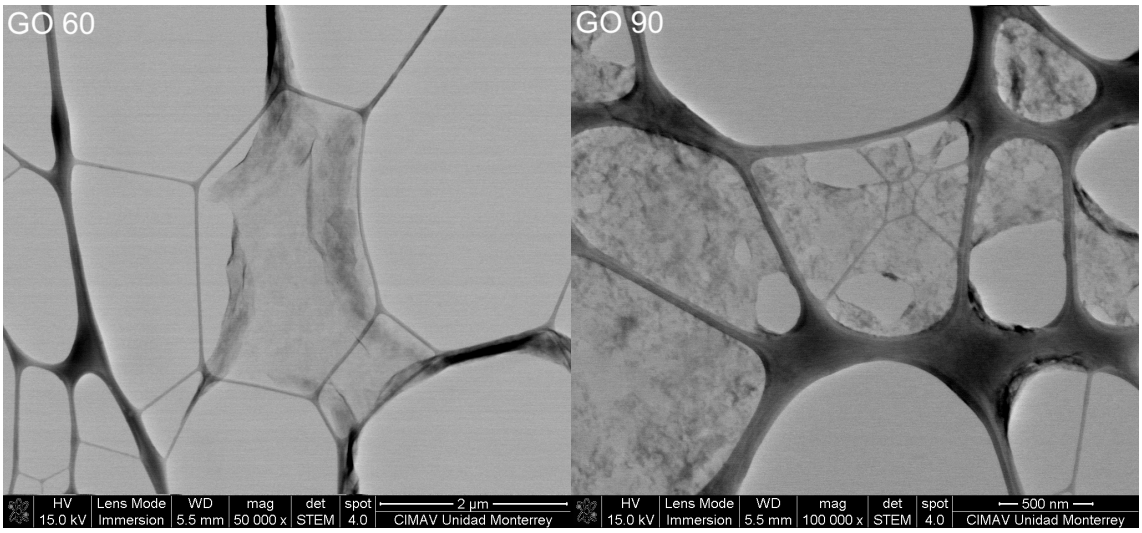
[b] *Department of Chemistry and Chemical Engineering, Chalmers University of Technology, SE-412 96 Göteborg, Sweden*

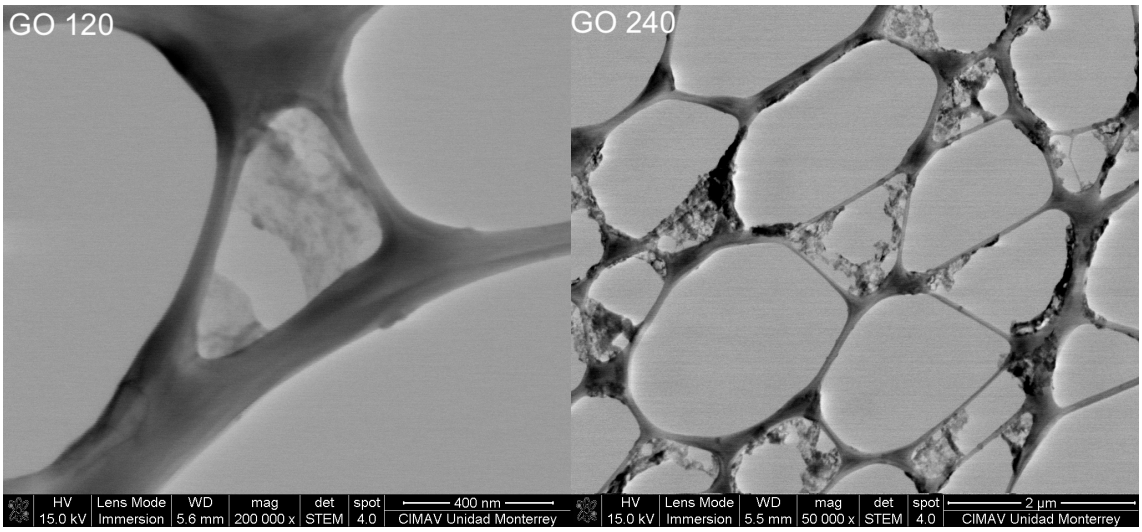
[c] *Group of Polymer Nanocomposites, Unidad Monterrey, Alianza Norte No. 202, PIIT, Apodaca, N.L. CP 66628, México*

Scanning transmission electron microscopy size determination

In order to follow the size modification, besides the DLS, STEM results are presented in Figure S1 at low and high magnification micrographs.




GO 60
HV 15.0 kV | Lens Mode Immersion | WD 5.5 mm | mag 50 000 x | det STEM | spot 4.0 | 2 µm | CIMAV Unidad Monterrey
GO 90
HV 15.0 kV | Lens Mode Immersion | WD 5.5 mm | mag 100 000 x | det STEM | spot 4.0 | 500 nm | CIMAV Unidad Monterrey


GO 120
HV 15.0 kV | Lens Mode Immersion | WD 5.6 mm | mag 200 000 x | det STEM | spot 4.0 | 400 nm | CIMAV Unidad Monterrey
GO 240
HV 15.0 kV | Lens Mode Immersion | WD 5.5 mm | mag 50 000 x | det STEM | spot 4.0 | 2 µm | CIMAV Unidad Monterrey

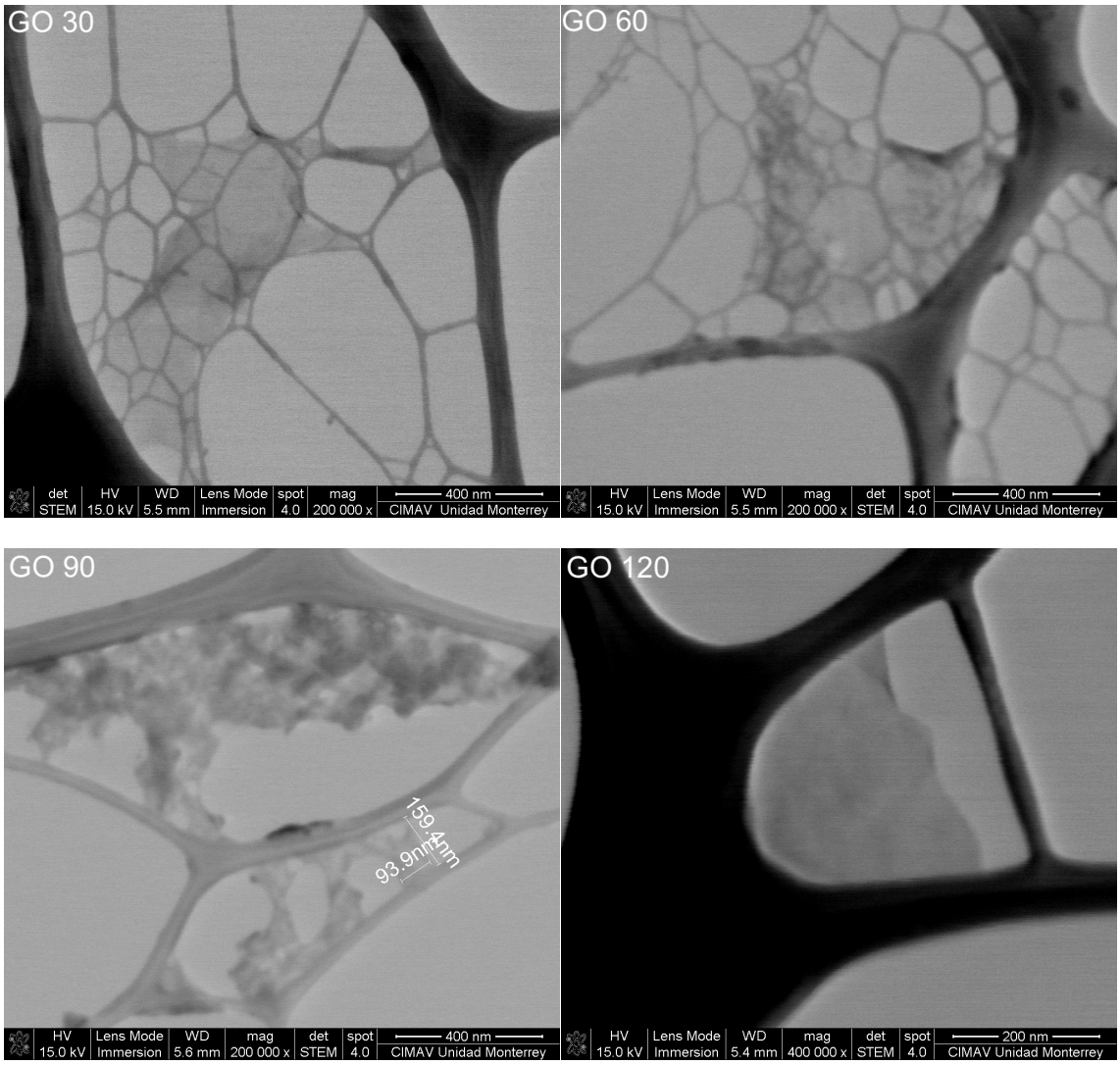


Figure S1. STEM micrographs for the synthesized GO at low and high magnifications.

Dynamic light scattering (DLS) size determination

In order to easily follow the size modification, a common technique used is DLS [1-4]. The obtained results shown in Figure S2, follow a logarithmic trend, plotted in Fig. 2.

Figure S2. DLS measurements for all GO samples.

Stability measurements by Zeta-potential

The variation of the Zeta-potential during the experiments is presented in Figure S3.

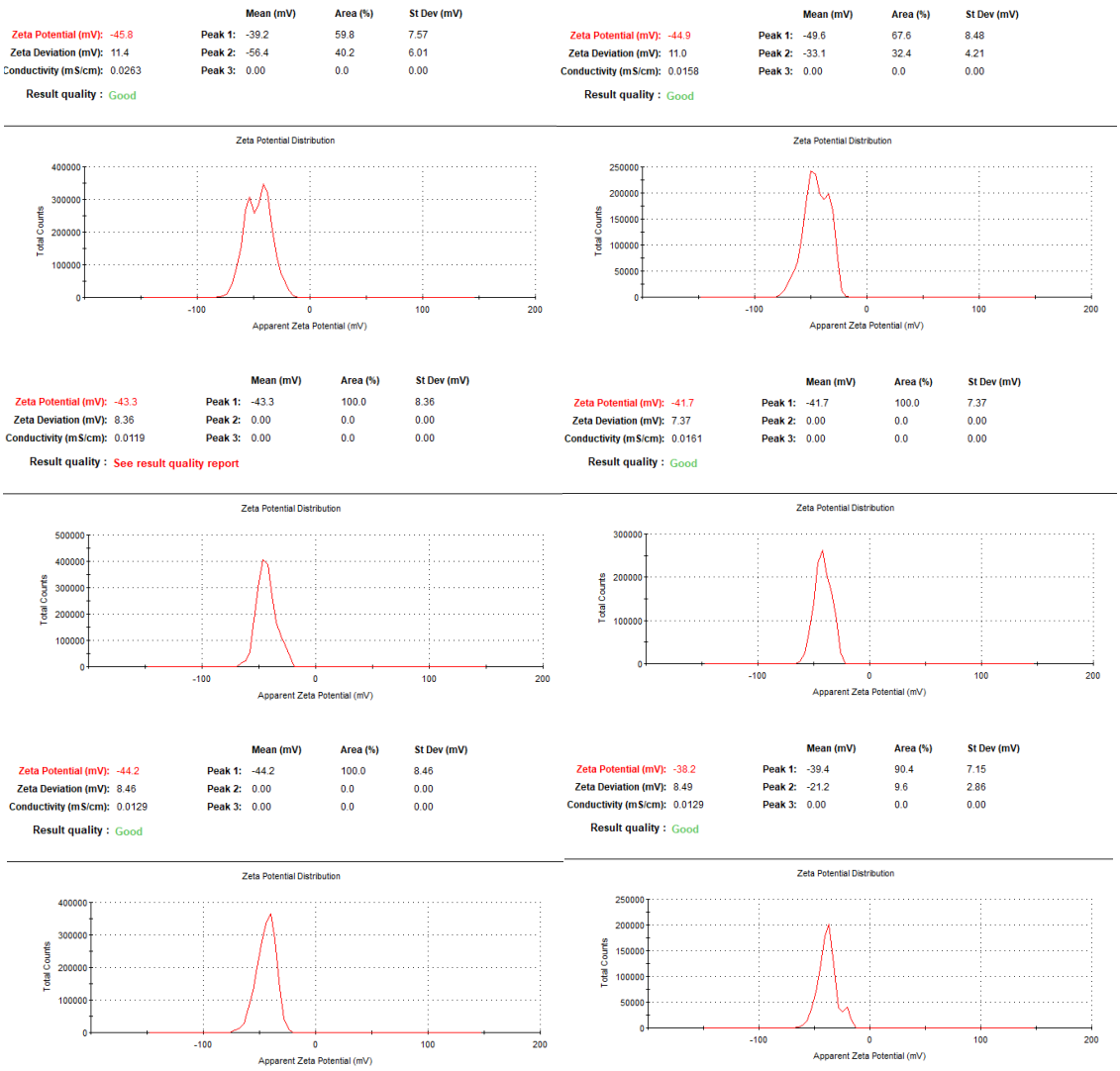
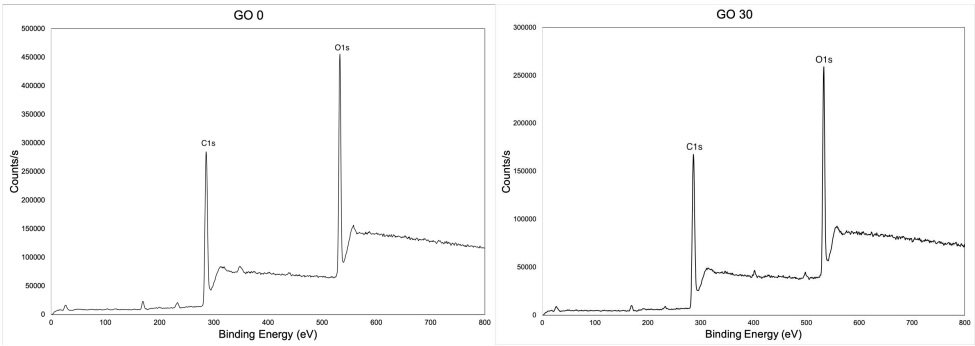


Figure S3. ζ-potential results for the GO 0, GO 30, GO 60, GO 90, GO 120 and GO 240.

Carbon-Oxygen content from XPS

The Carbon Oxygen content from survey is presented in Figure S4.



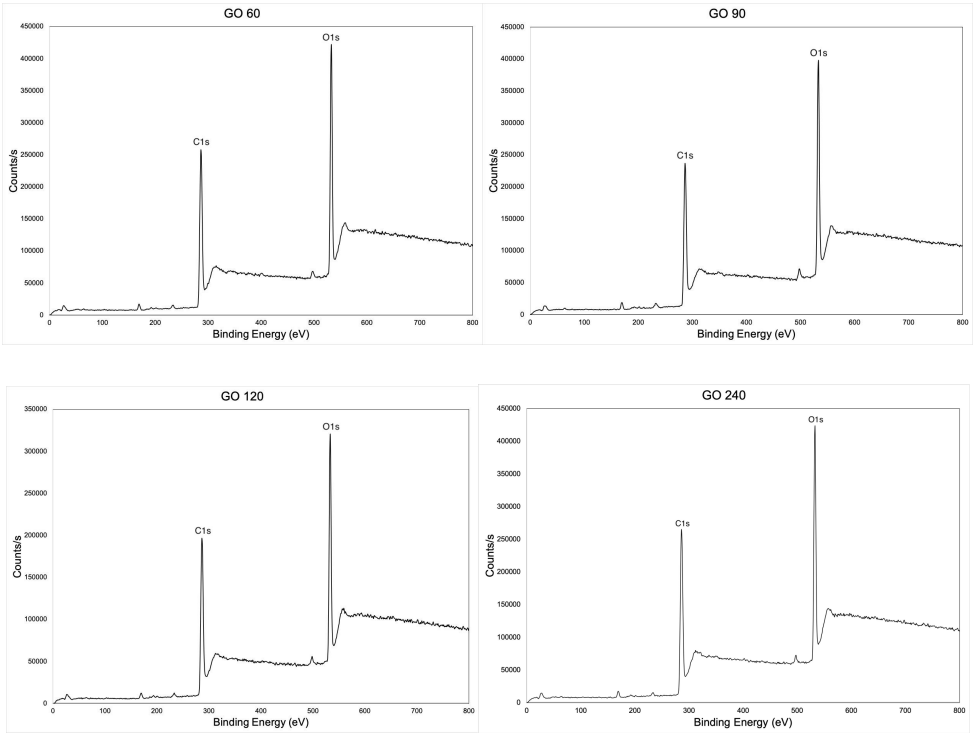


Figure S4. Surveys from GO 0, GO 30, GO 60, GO 90, GO 120 and GO 240.

References

1. J. Wang, Y. Cao, Q. Li, L. Liu and M. Dong, *Chemistry – A European Journal*, 2015, **21**, 9632-9637.
2. M. Huskić, S. Bolka, A. Vesel, M. Mozetič, A. Anžlovar, A. Vizintin and E. Žagar, *European Polymer Journal*, 2018, **101**, 211-217.
3. U. A. Méndez-Romero, S. A. Pérez-García, X. Xu, E. Wang and L. Licea-Jiménez, *Carbon*, 2019, DOI: https://doi.org/10.1016/j.carbon.2019.02.023.
4. E. Bidram, A. Sulistio, A. Amini, Q. Fu, G. G. Qiao, A. Stewart and D. E. Dunstan, *Carbon*, 2016, **103**, 363-371.