Supplementary Material: Preparation of Few-Layer Graphene Dispersions from Hydrothermally Expanded Graphite

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Supplementary figures

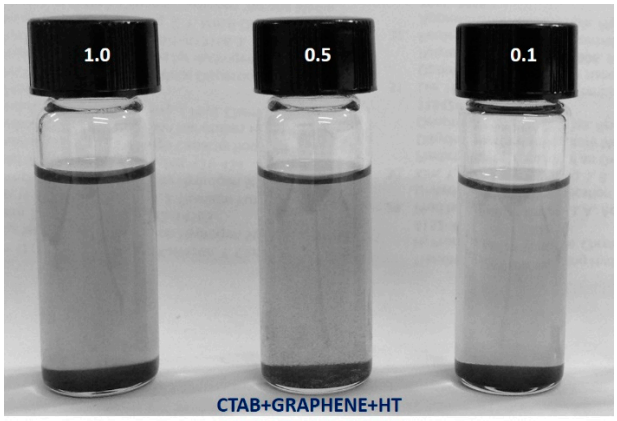


Figure S1. Obtained graphene dispersions (12 weeks stored) after hydrothermal treatment (HT), 3 h of sonication and centrifugation, in the three different concentrations of CTAB (0.1, 0.5, and 1.0 mg mL^{-1}) reported in the main text. After sonication, the obtained suspensions were left to stand overnight and then centrifugated for 90 min at 2000 rpm.

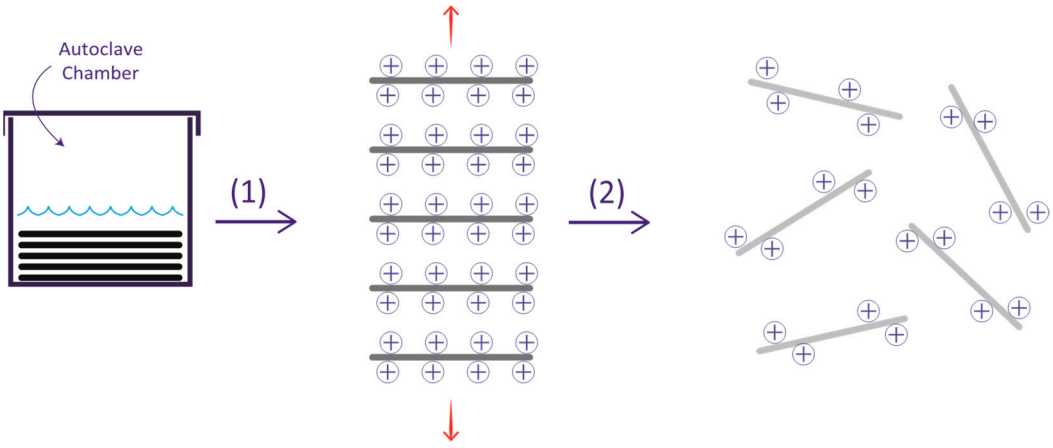


Figure S2. Schematic route of the preparation process for FLG dispersions. Natural graphite flakes are added into CTAB aqueous solution (at different surfactant concentrations: 0.1, 0.5, and 1.0 mg mL-1). The resulting mixture is reacted at 180 °C for 15 h. The obtained pretreated graphite is immediately dispersed in the very same CTAB aqueous solution by sonication.

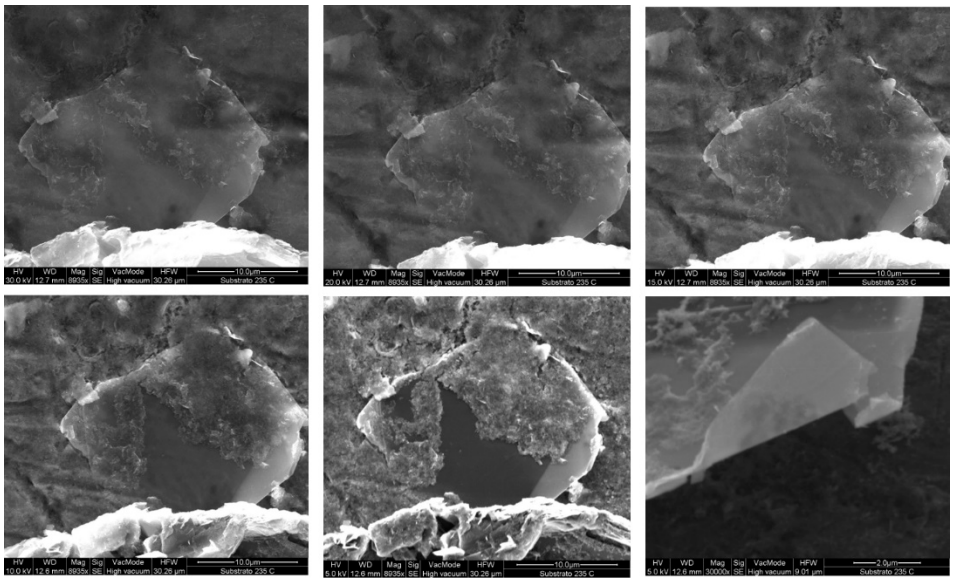
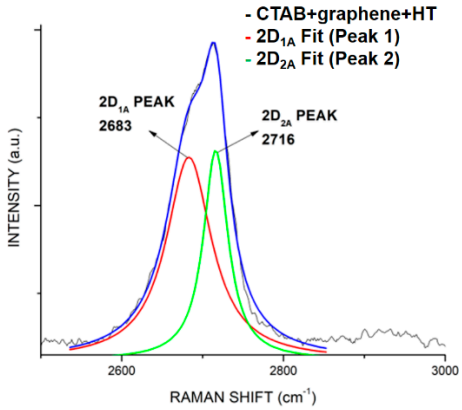


Figure S3. Scanning electron microscopy (SEM) morphology of dispersed graphene layer in 1.0 mg mL^{-1} of CTAB aqueous solution, by changing the accelerating voltage from 5 to 30 kV. Semitransparent layer extracted from supernatant after HT, 3 h of sonication, centrifugation for 90 min at 2000 rpm, and dried at 235 ˚C.



Model	Lorentz		
Equation	y = y0 + (2*A/PI)*(w/(4*(x-xc)^2 + w^2))		
Reduced Chi-Sqr	3.82826E-5		
Adj. R-Square	0.9968		
		Value	Standard Error
Peak1(INTENSITY)	y0	0.02423	9.88363E-4
	xc	2683.09501	0.83042
	w	68.29669	1.58128
	A	24.76082	1.07489
	H	0.23081	
Peak2(INTENSITY)	y0	0.02423	9.88363E-4
	xc	2716.24481	0.28414
	w	36.86775	1.03808
	A	13.83854	0.75403
	H	0.23896	

Figure S4. Raman spectrum of the 2D peak of dispersed graphene in 0.1 mg mL^{-1} of CTAB aqueous solution and fitting of the 2D peaks with two Lorentzian functions. The w values represent the respective full width at half maximum (FWHM) values.

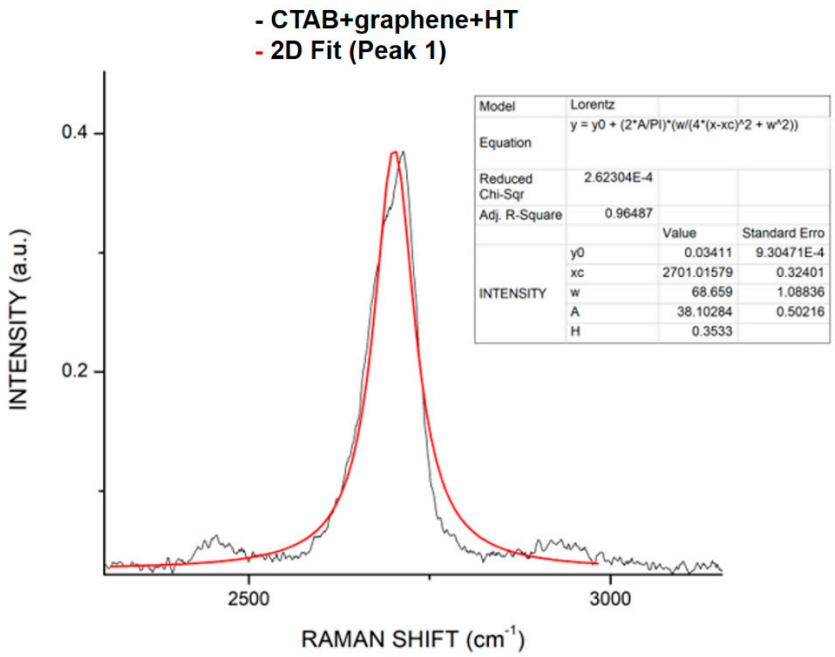


Figure S5. Raman spectrum of the 2D peak of dispersed graphene in 0.1 mg mL^{-1} of CTAB aqueous solution and fitting of the 2D peaks with one Lorentzian function. The w value represents the respective FWHM value.

Sample preparation

The exfoliated graphene flakes were characterized by spectroscopy and microscopic techniques. The graphene dispersion was grayish in color and stable without any visible aggregation after centrifugation. Trying to assure that the obtained SEM morphologies were intrinsic and free from surfactant, the FLG samples prepared by drop casting of dispersion on aluminum substrates, were recovered after centrifugation and heated to 235 °C for 4 h. A similar technique was used for Raman spectrum, however, the FLG sample analyzed was at the lowest concentration of CTAB (0.1 mg mL^{-1}). The Origin v.8.0 commercial mathematical package was used for fitting curves.