Electronic Supplementary Information for manuscript:

Single-step synthesis of graphene quantum dots by femtosecond laser ablation of graphene oxide dispersions

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KEYWORDS: graphene quantum dots, graphene oxide, graphene, femtosecond laser ablation, blue luminescence, electronic devices.

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Table S1: Absolute and Gaussian fit values for GQDs obtained at 1.3 W and 2.4W at four ablation timepoints: 5, 15, 30, and 60 minutes

Ablation Time (min)	Power: 1.3 W					Power: 2.4W				
	Absolute		Gaussian Fit			Absolute		Gaussian Fit		
	$\bar{x}_{abs}$	σ_{abs}	$\bar{x}_{std}$	σ_{std}	R^2	$\bar{x}_{abs}$	σ_{abs}	$\bar{x}_{std}$	σ_{std}	R^2
5	1.765	0.1398	1.672	0.0622	0.81	1.432	0.1176	1.461	0.2177	0.76
15	1.849	0.2336	1.825	0.0981	0.87	2.4057	0.5275	2.319	0.6246	0.92
30	2.275	0.5898	2.087	1.938	0.78	3.3785	0.8009	3.025	0.6826	0.93
60	3.923	0.7170	3.462	1.028	0.80	3.2632	0.5941	2.977	0.4207	0.93

$*\bar{x}_{abs}$ is the mean, σ_{abs} is the mean absolute deviation, $\bar{x}_{std}$ is the mean of the Gaussian fit, σ_{std} is the standard deviation, and R^2 is the coefficient of determination

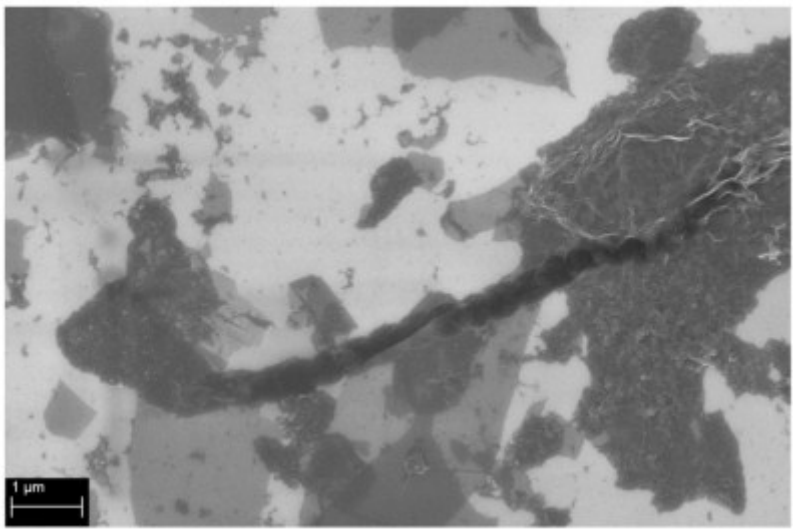

Figure S1: SEM image of GO sheets after 5min of laser ablation. It should be noted that some layers appear twisted and we hypothesize that it might be due to the stirring of the solution

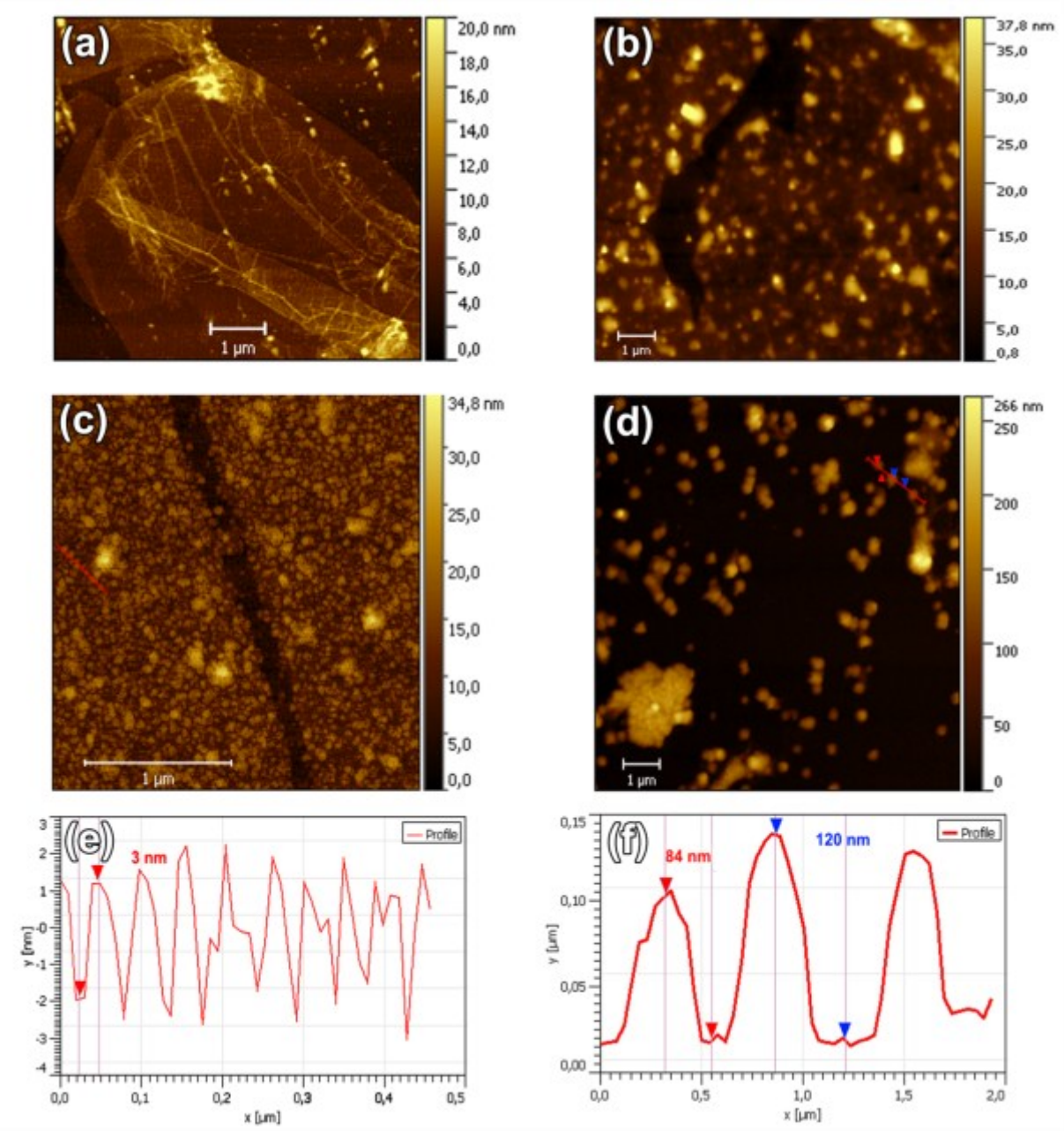

Figure S2: AFM images of the GO dispersions after (a) 5 minutes. (b) 15 minutes, (c) 30 minutes and (d) 60 minutes of laser ablation; (e) and (f) heigth profiles of image (c) and (d) respectively.

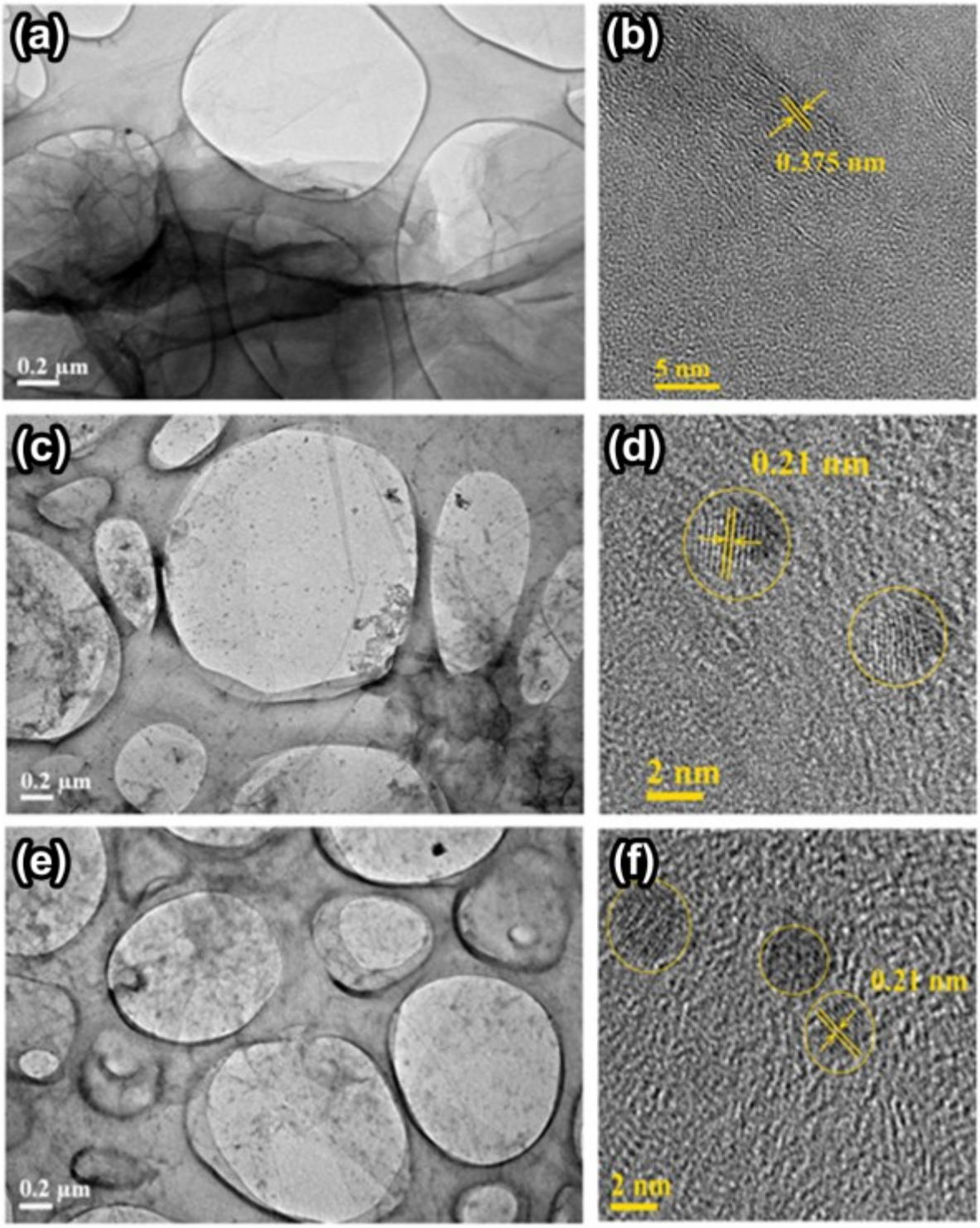

Figure S3: TEM images of a) non-treated GO solution and GO solution after (c) 5, (e) 15 minutes of laser ablation. In panel (b) HRTEM image of the non-modified GO sheets shows an interlayer d-spacing of 0.375 nm, which is larger than that of the graphite due to the presence of oxygen/containing groups. HR images (d) and (f), show the presence of few graphene quantum dots within the graphene oxide sheets after 5 and 15 minutes of laser treatment, respectively.

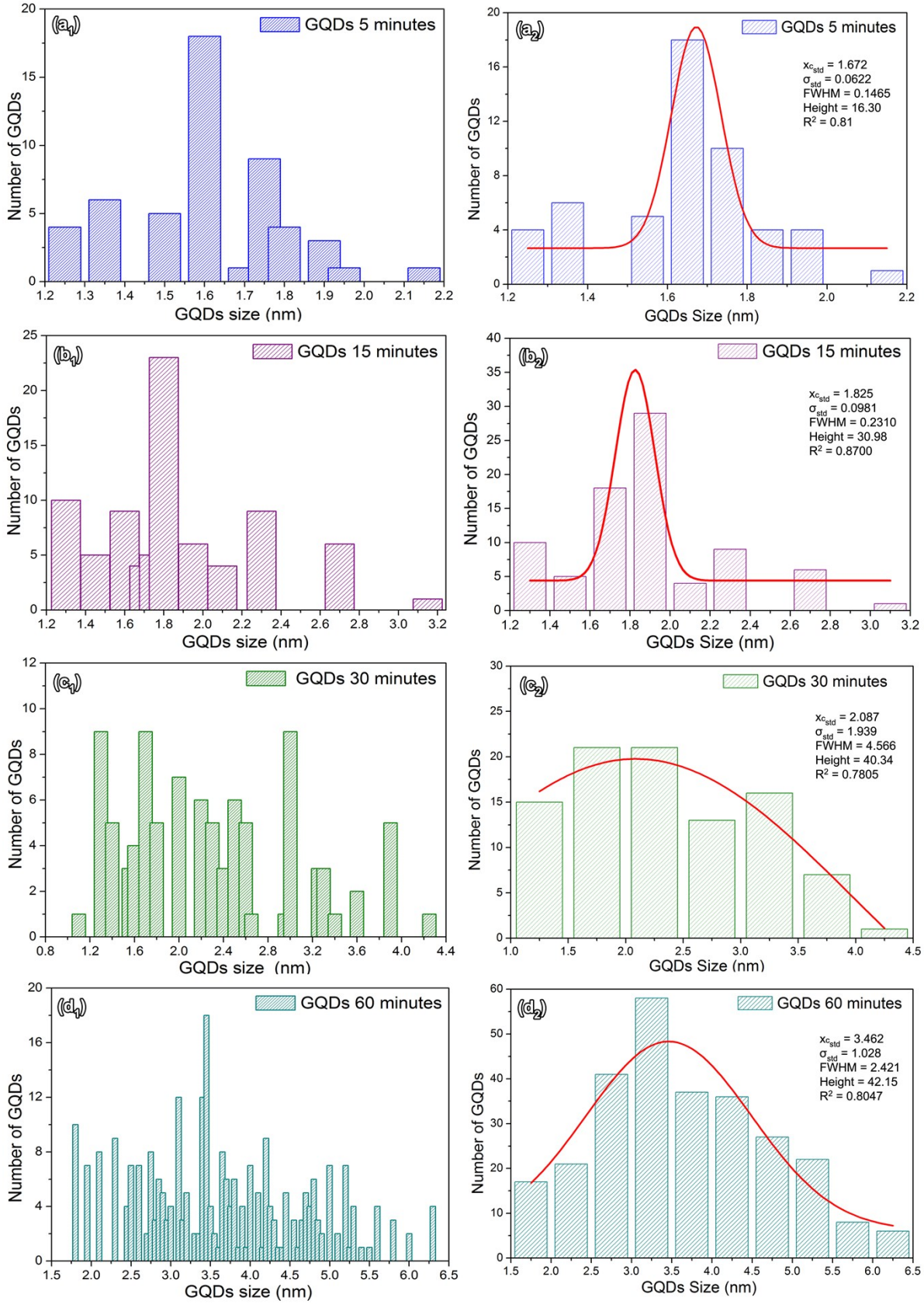

Figure S4: (1) Raw and (2) binned size distribution of GQDs after (a) 5 minutes, (b) 15 minutes, (c) 30 minutes and (d) 60 minutes of laser ablation at 1.3W

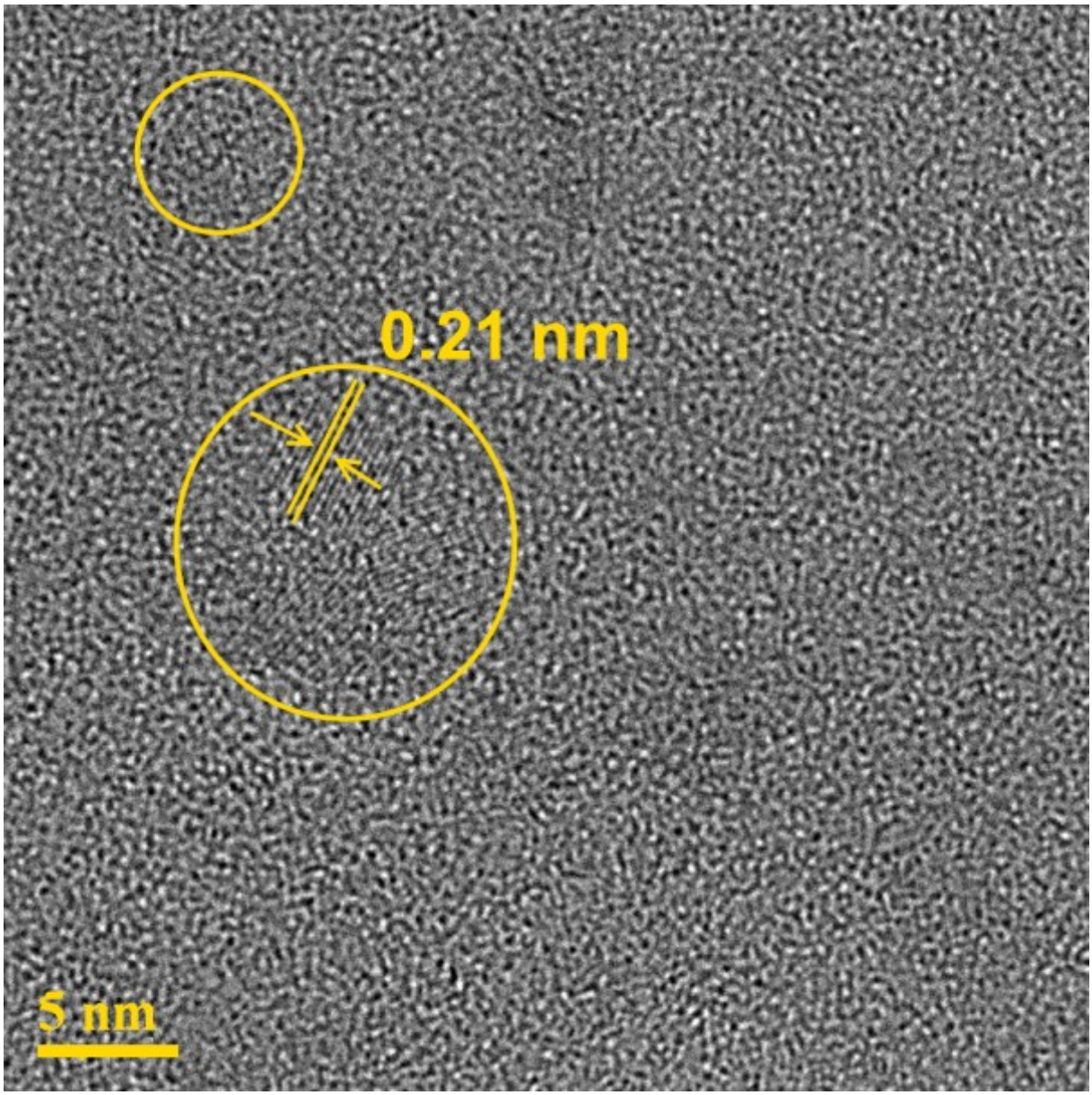

Figure S5: HRTEM image of dialysed GQDs dispersion obtained after 30 minutes of laser ablation.

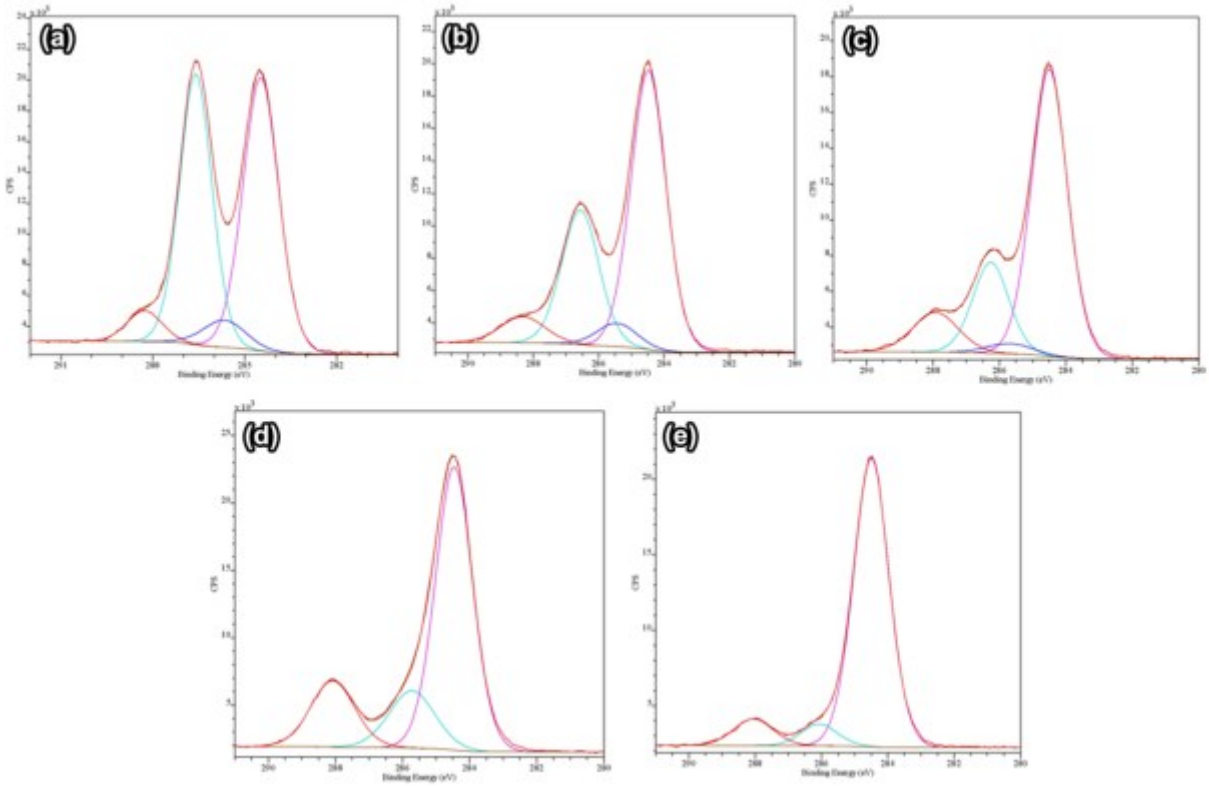

Figure S6: XPS of GO solution before (a) and after PLA at 1.3W for (b) 5, (c) 15, (d) 30 and (e) 60 minutes respectively.

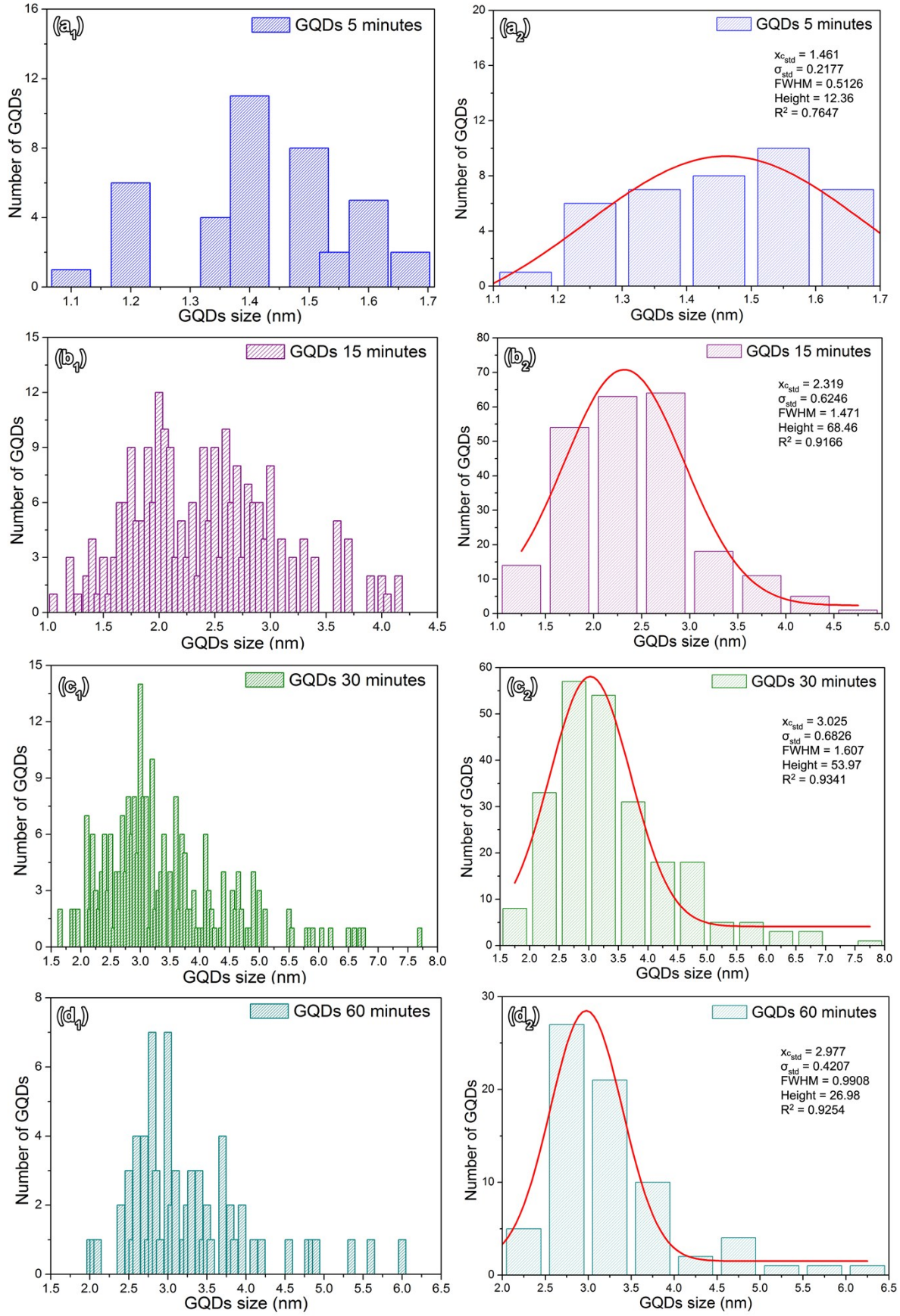

Figure S7: (1) Raw and (2) binned size distribution Size distribution of the GQDs obtained at 2.4W after (a) 5, (b) 15, (c) 30, and (d) 60 minutes of laser ablation

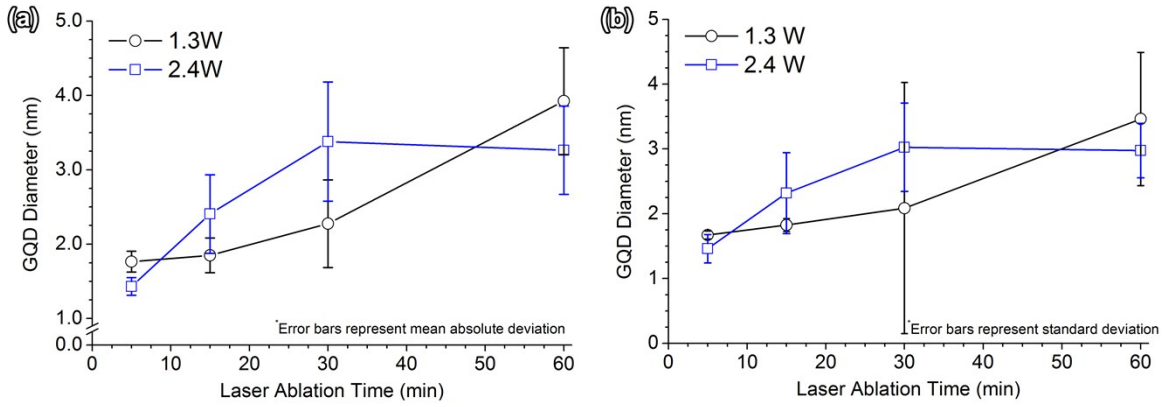

Figure S8: GQDs diameter as a function of the laser ablation time at different laser ablation powers using (a) absolute values and (b) Gaussian fit values from binned size distribution.

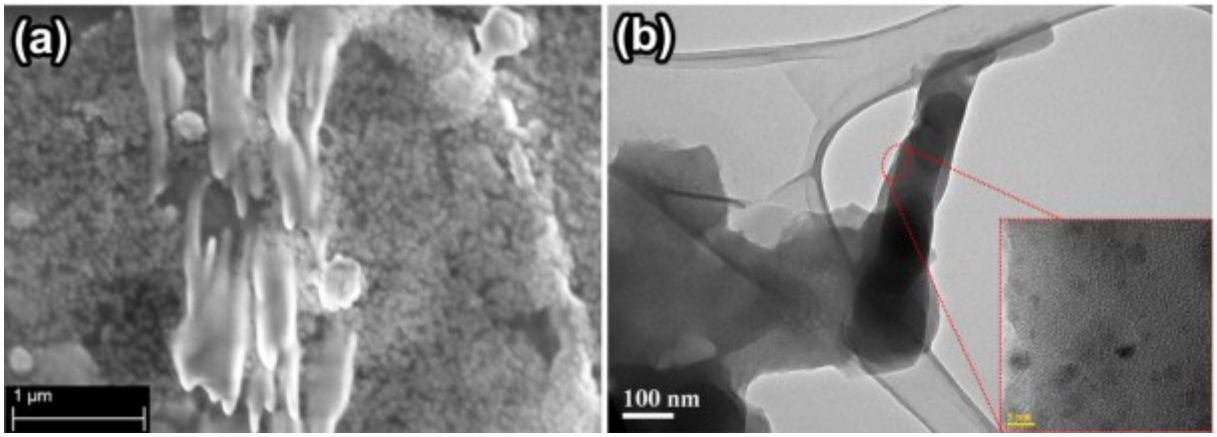

Figure S9: a) SEM image of the solution after 60 minutes of ablation at 2.4W. Some tubular structures are observable within the damaged sheets; b) TEM and HRTEM (inset) images of the tubular structures. These structures are made up of folded sheets where some GQDs are found to be embedded in.

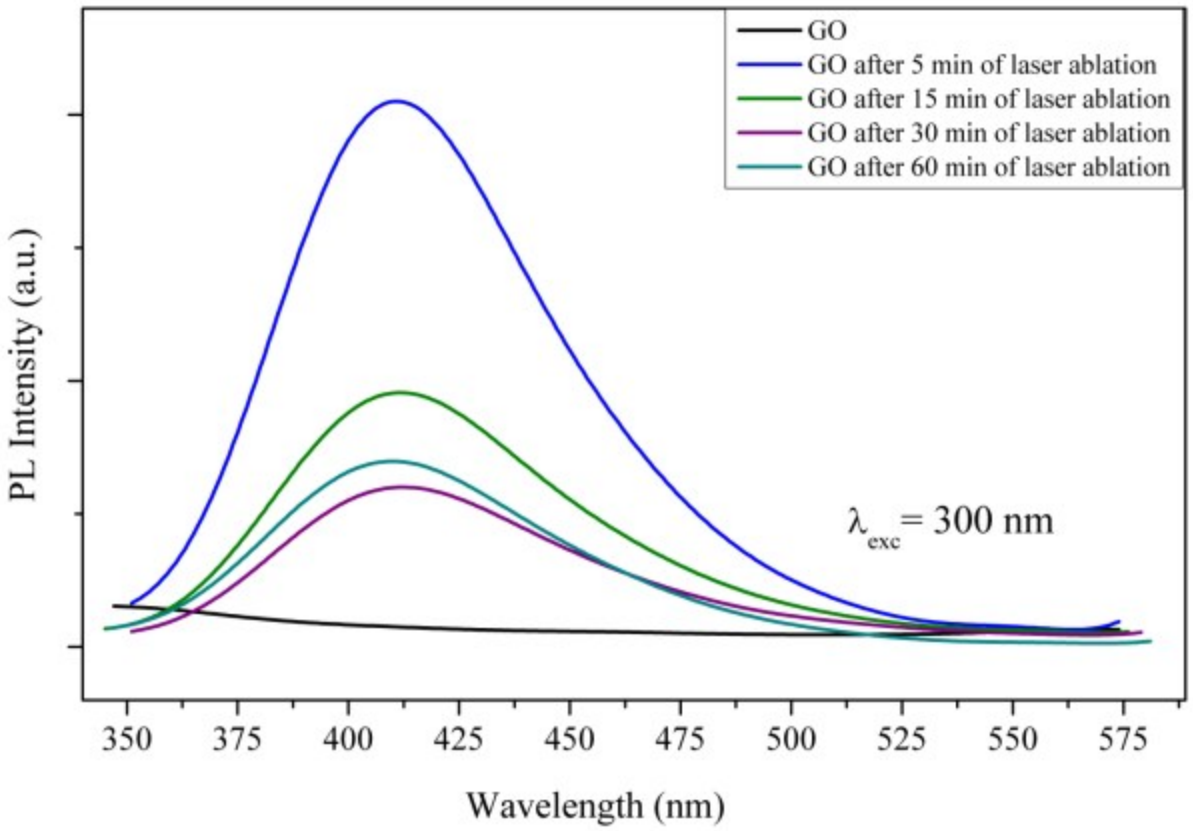

Figure S10: PL spectra of GQDs solutions obtained after 5, 15, 30 and 60 minutes of laser ablation of GO. The PL spectra were recorded at an excitation wavelength of 300 nm. The laser treated solutions showed blue luminescence at 410 nm, while the starting GO did not show any luminescence.

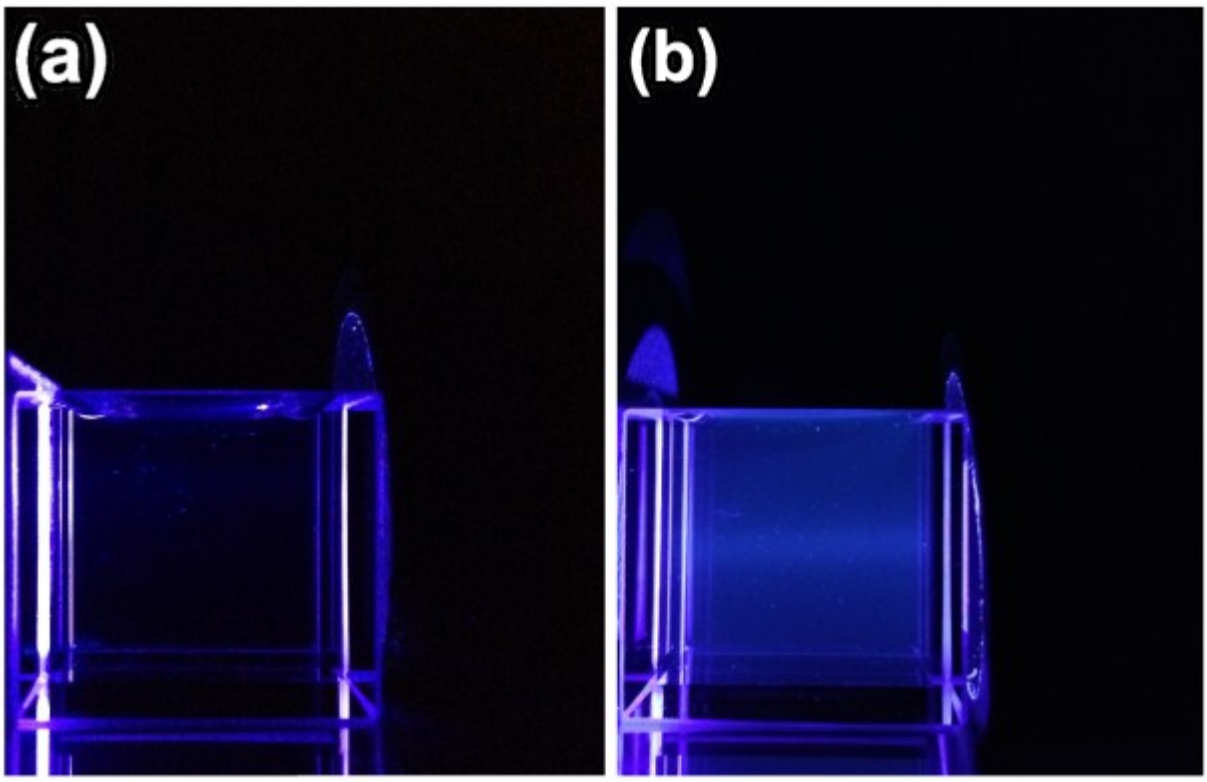

Figure S11: Photographs of (a) water and (b) dialysed GQDs dispersion obtained after 30 minutes of laser ablation at 1.3W under 365 nm UV light.