Supplementary Information (SI) for Nanoscale.

Supporting Information

Surface plasmon resonance as a breakthrough tool for characterizing the size and shape of graphene quantum dots

Giuseppe Stefano Basile, Damiano Calcagno, Nunzio Tuccitto, Benoit Maxit, Pascal Boulet, Mélanie Emo, Liang Liu, Giuseppe Grasso * and Philippe Pierrat *

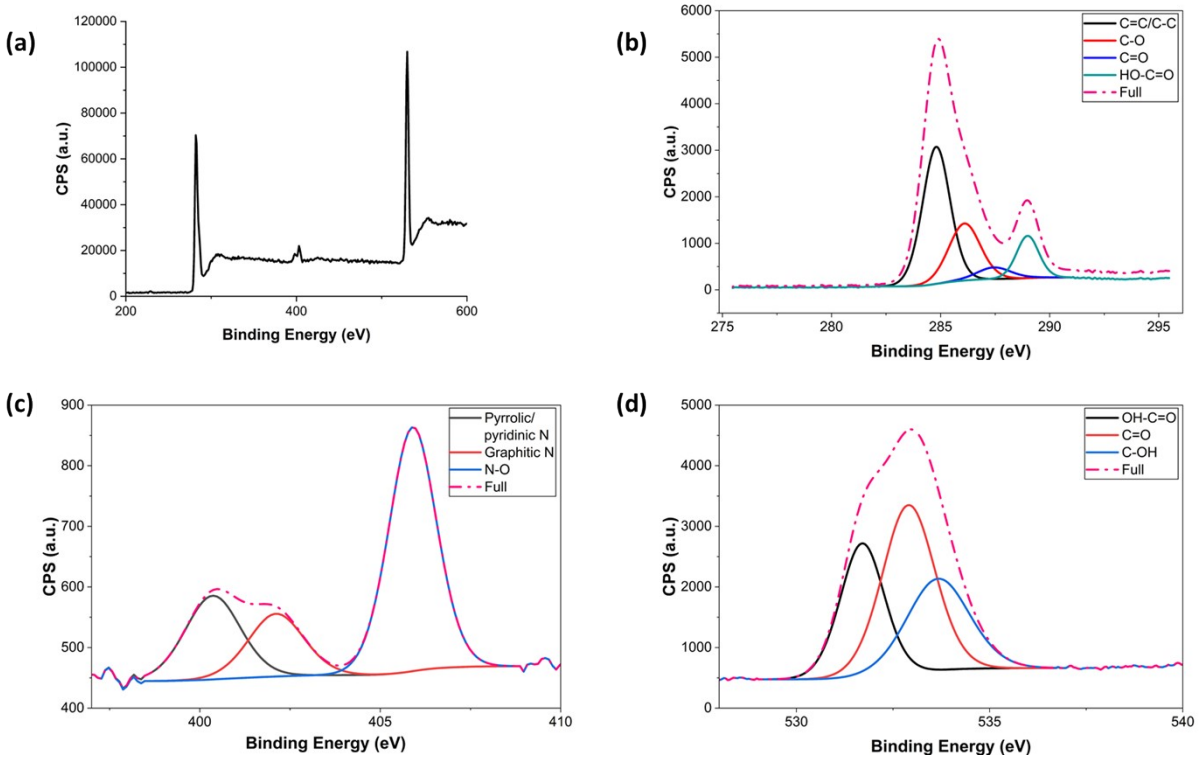

Fig. S1. XPS spectra of GQDs-01: (a) survey spectrum, (b) high-resolution C1S spectrum, (c) high-resolution N1S spectrum and (d) high-resolution O1S spectrum.

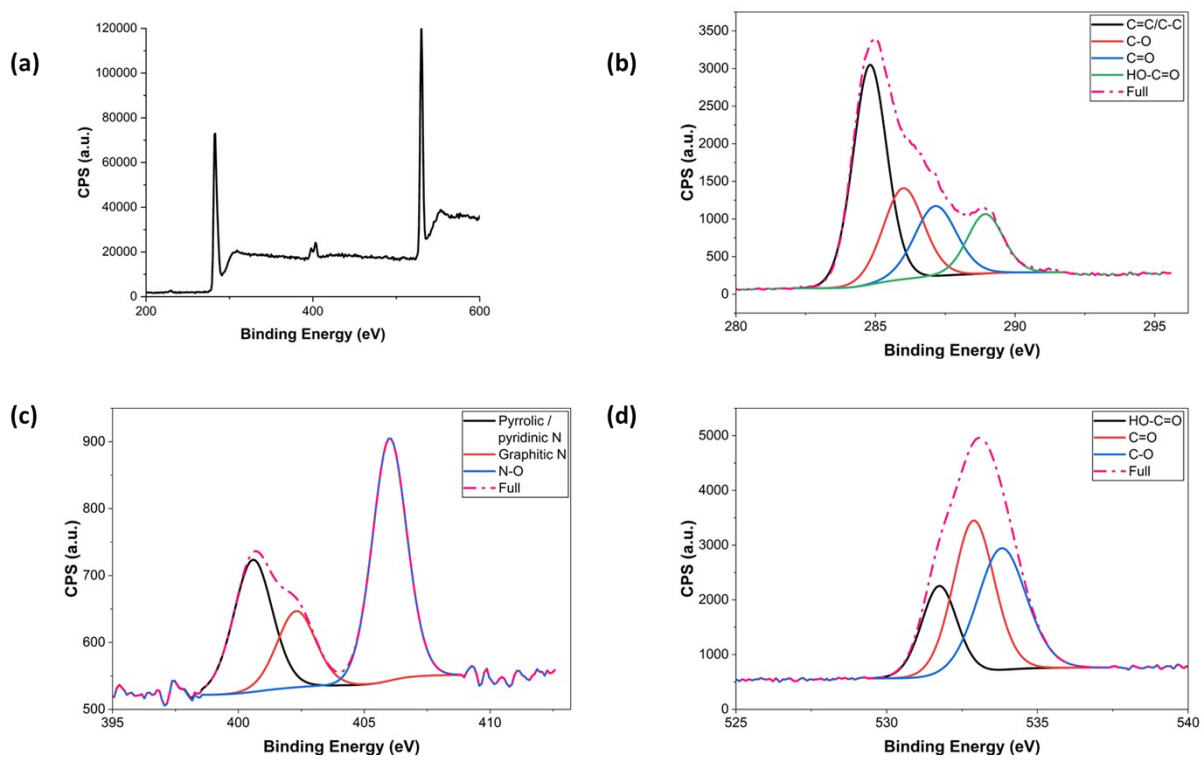

Fig. S2. XPS spectra of GQDs-02: (a) survey spectrum, (b) high-resolution C1S spectrum, (c) high-resolution N1S spectrum and (d) high-resolution O1S spectrum.

Table S1. Elemental composition obtained from the XPS wide spectra

	Elemental composition		
	C1s	**O1s**	**N1s**
GQDs-01	65,0	29,2	5,1
GQDs-02	66,2	28,2	5,0

Table S2. Carbon bond composition obtained using the high resolution XPS C1s spectra

	Carbon bond composition (C1s, %)			
	C=C / C-C	**C-O**	**C=O**	**HO-C=O**
GQDs-01	54,6	26,1	5,7	13,6
GQDs-02	45,9	22,7	18,1	13,2

Table S3. Oxygen bond composition obtained using the high resolution XPS O1s spectra

	Carbon bond composition (O1s, %)		
	HO-C=O	**C=O**	**C-OH**
GQDs-01	28,8	43,2	28,0
GQDs-02	21	40,6	38,4

Table S4. Nitrogen bond composition obtained using the high resolution XPS N1s spectra

	Carbon bond composition (N1s, %)		
	Pyrrolic / Pyrrolic N	**Graphitic N**	**N-O**
GQDs-01	23,5	17,6	58,9
GQDs-02	31,2	18,0	50,8

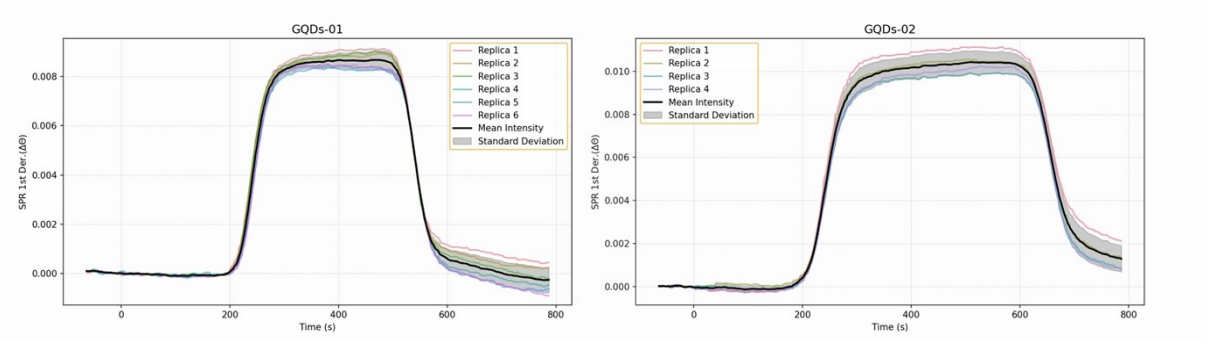

Fig. S3. Surface Plasmon Resonance raw sensograms of GQDs-01 (left) and GQDs-02 (right) samples. Multicolor lines represent the experimental replicas; the black line is the mean curve, while the grey shadow depicts the standard deviation.

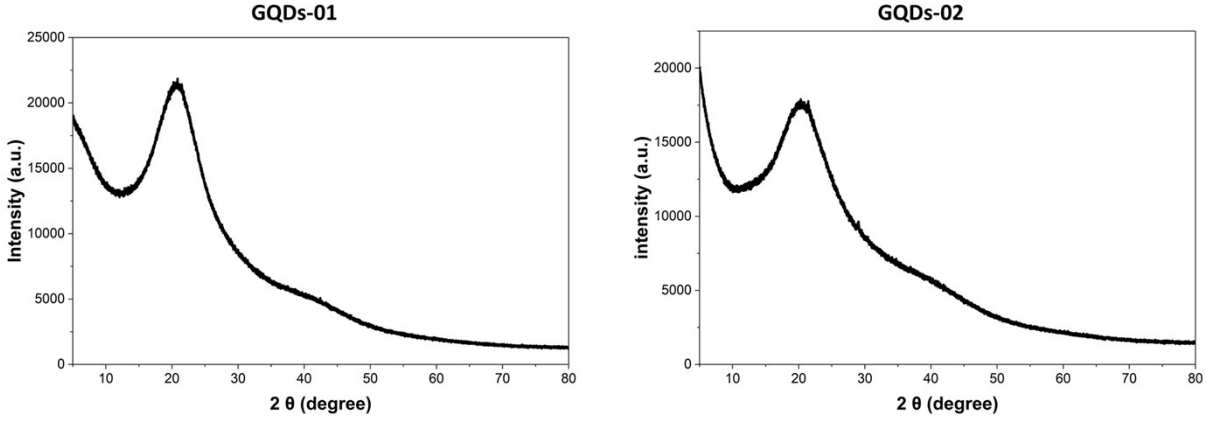

Fig. S4. XRD pattern of GQDs-01 (left) and GQDs-02 (right) samples.

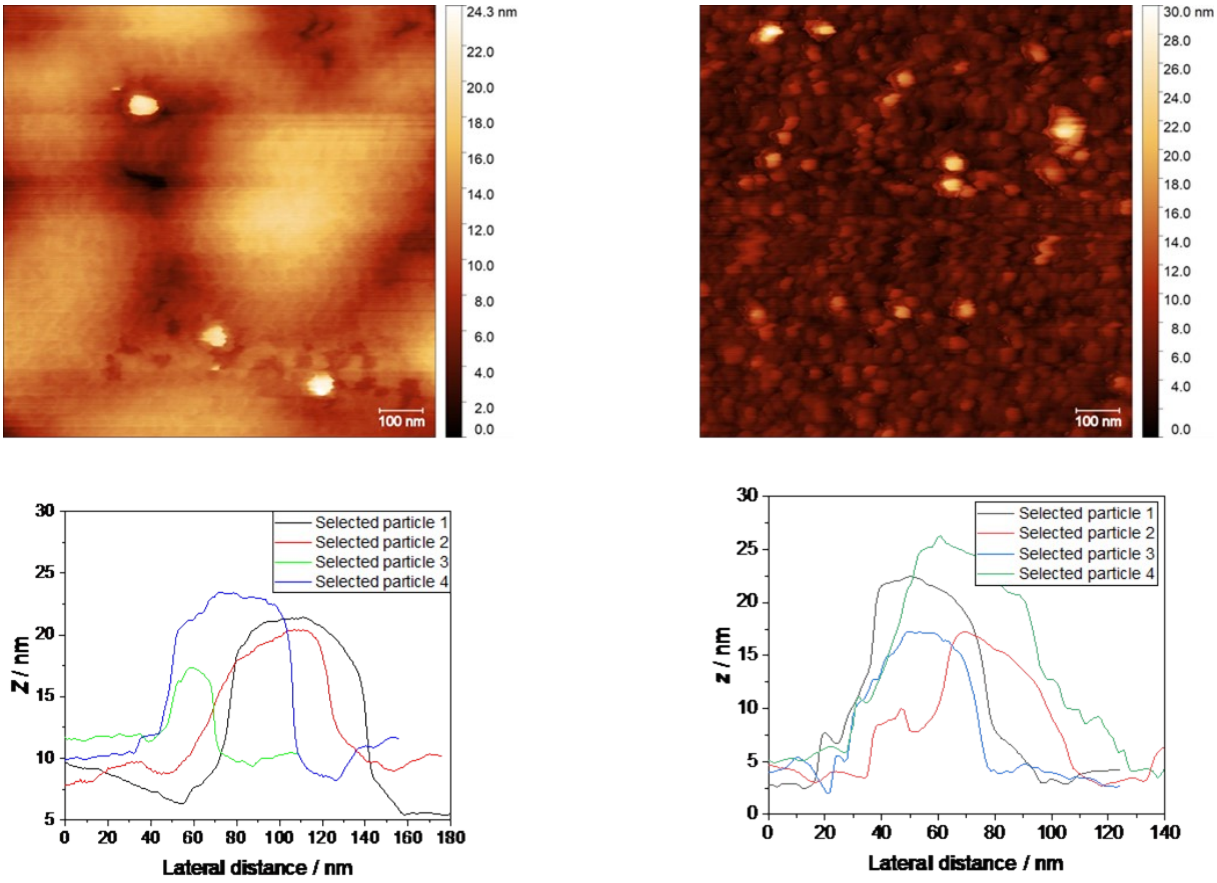

Fig. S5. AFM images (up) and height profiles (down) of GQDs-01 (left) and GQDs-02 (right) samples. Note that due to the limitation of the resolution of the tip, the lateral size might not be reliable.

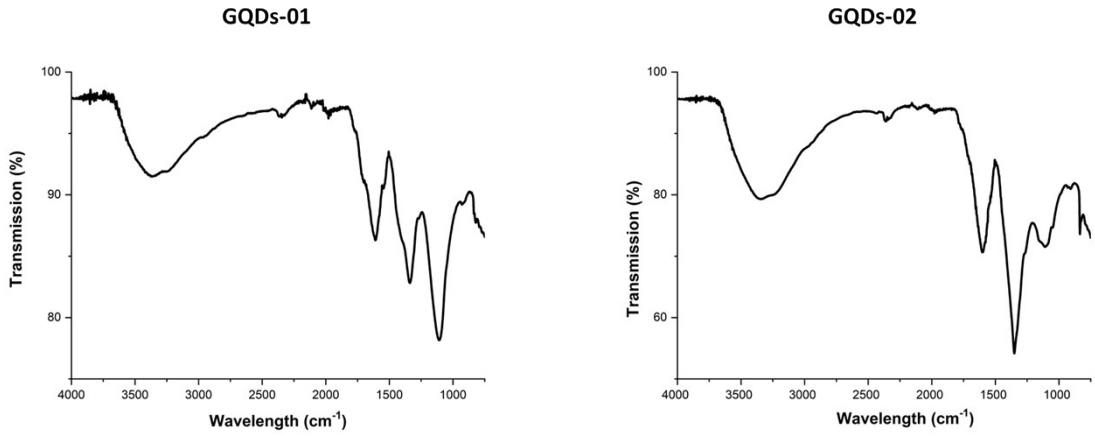

Fig. S6. FTIR pattern of GQDs-01 (left) and GQDs-02 (right) samples.

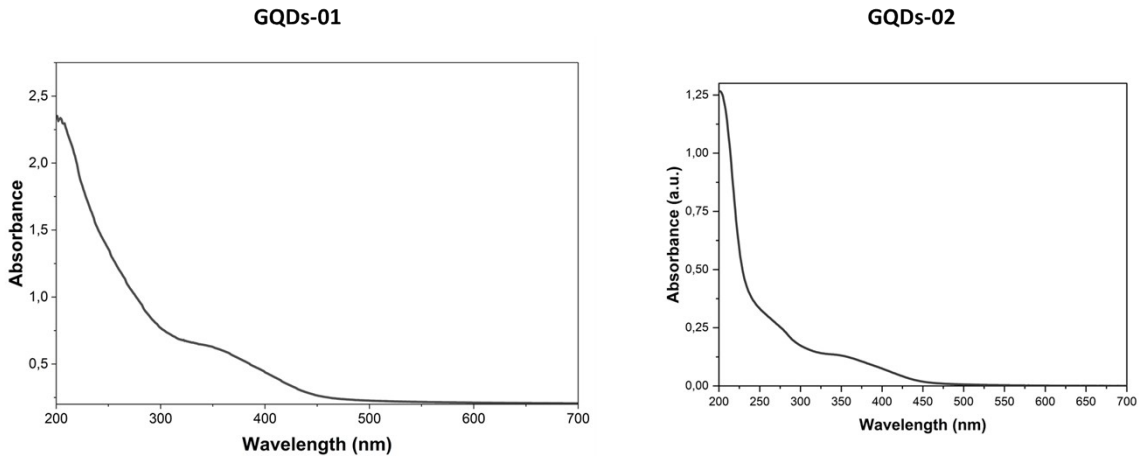

Fig. S7. UV-vis spectra of GQDs-01 (left) and GQDs-02 (right) samples.

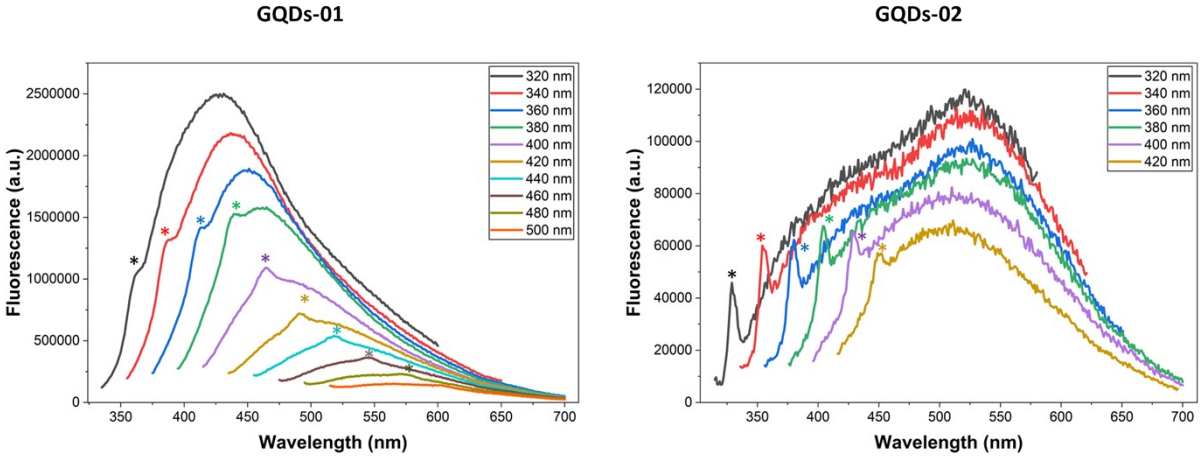

Fig. S8. PL spectra of aqueous solution of GQDs-01 (left) and GQDs-02 (right) samples (20µg/mL) at diverse excitation wavelengths. Peaks marked with an asterisk (*) originate from Raman scattering of water (O–H vibrational modes), appearing at a fixed Raman shift relative to the excitation wavelength.