Few-Layer Graphene, 150-500nm

BioGraph Solutions

Characterization of the lyophilized powder:

- **Thermogravimetric Analysis (TGA) - Graphene (N_2 -600 ºC)** = 5.5%

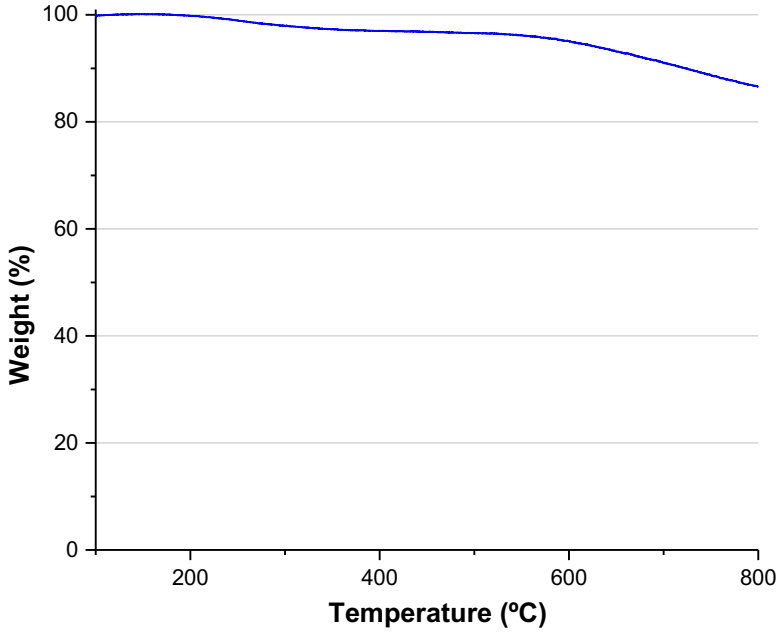

Figure 1. Thermogravimentric analysis of Sweet Graphene.

- **Elemental Analysis** (average):
  88.87±0.11 Wt%C – 1.36±0.00 Wt%H - 0.14±0.01 Wt%N - 0.73±0.002 Wt%S
- **Sheet Resistance:** 205.98 ± 50.18 Ω/ sq
- **Total Reflection X-ray Fluorescence** (TXRF): 0.270 mg/L Fe

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Element	Line	Conc. (mg/L)	Sigma (mg/L)	RSD (%)	LLD (mg/L)	Net area	Backgr.	Chi
Si	K12	37.95	0.24	0.6	0.16	30712	1900	3.51
P	K12	Not det.			0.08	32	2035	1.70
S	K12	2.383	0.036	1.5	0.044	7081	1888	1.95
Cl	K12	0.827	0.018	2.2	0.027	4046	1911	1.25
K	K12	1.120	0.012	1.1	0.012	11968	1875	1.73
Ca	K12	3.527	0.018	0.5	0.009	45660	1666	1.24
Ti	K12	9.596	0.022	0.2	0.005	237245	1447	2.86
V	K12	0.374	0.004	1.1	0.004	11644	1897	1.27
Cr	K12	0.019	0.001	7.6	0.003	743	1192	0.90
Mn	K12	0.006	0.001	17.2	0.002	278	1001	1.07
Fe	**K12**	**0.270**	**0.002**	**0.9**	**0.002**	**16195**	**919**	**0.95**
Ni	K12	0.017	0.001	4.0	0.001	1523	1054	1.38
Cu	K12	0.008	0.001	7.1	0.001	811	1257	1.63
Zn	K12	0.380	0.002	0.5	0.001	45444	1461	2.10
Ga (IS)	K12	2.000	0.004	0.2	0.001	272506	2066	10.57
As	K12	0.091	0.001	0.9	0.001	14257	668	1.40
Br	K12	0.017	0.000	2.2	0.000	3229	757	0.88
Sr	K12	0.011	0.000	3.2	0.001	2294	1464	15.44

- **Raman spectroscopy:**
  - FWHM (2D) = 66 cm^{-1}
  - I(D)/I(G) = 1.15
  - I(2D)/I(G) = 0.49
  - Number of layers[1]= 4

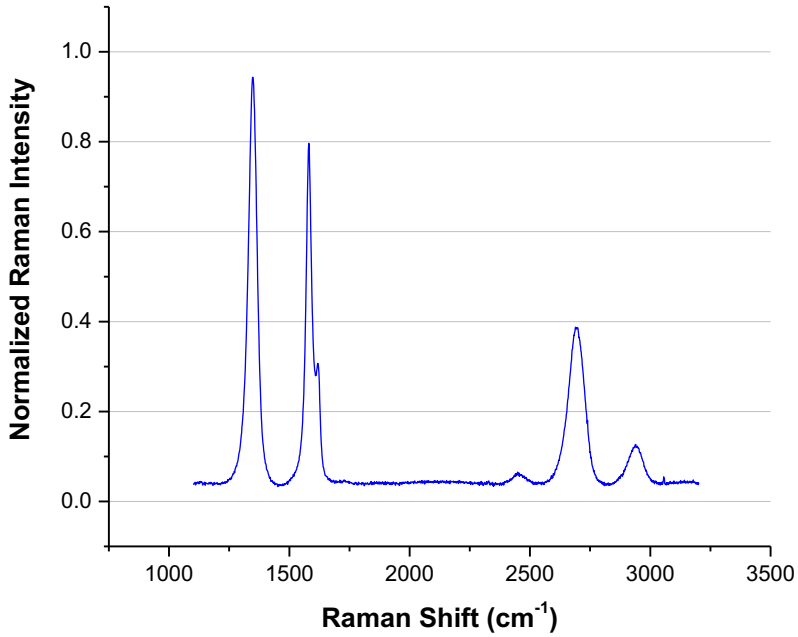


Figure 2. Normalized Raman spectrum of Sweet Graphene at 532 nm.

[1]K. R. Paton *et al.,* Scalable production of large quantities of defect-free few-layer graphene by shear exfoliation in liquids. *Nat. Mater.* 13, 624-630 (2014).

- **Transmission Electron Microscope (TEM):**
  Average size: 143 ± 53 nm

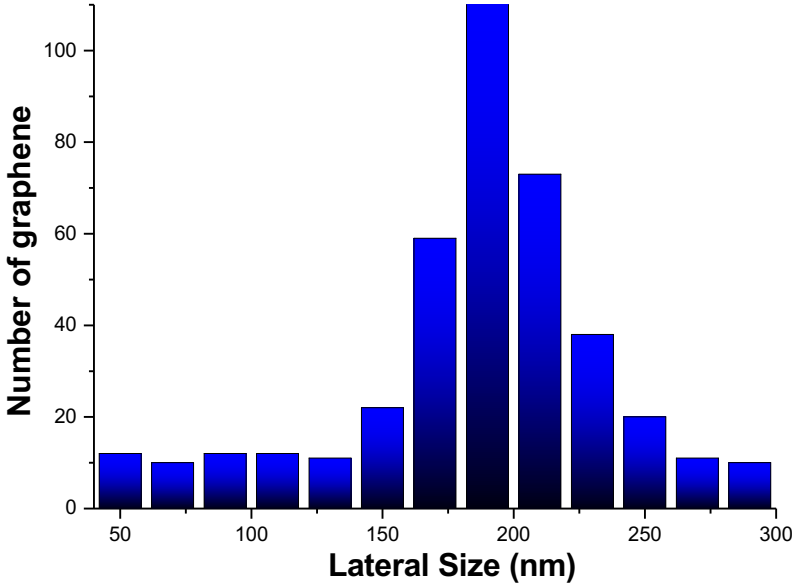
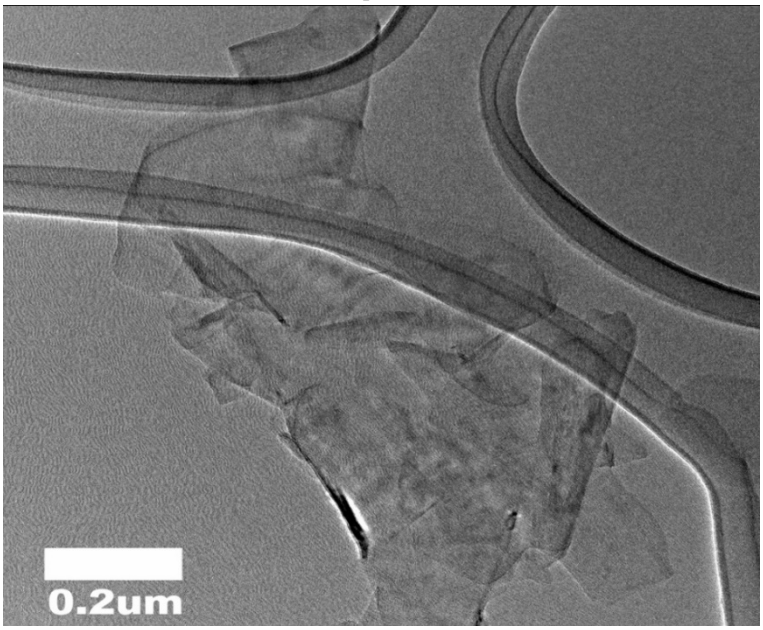


Figure 3. Lateral size distribution of ball-milled graphene from TEM images of Sweet Graphene.



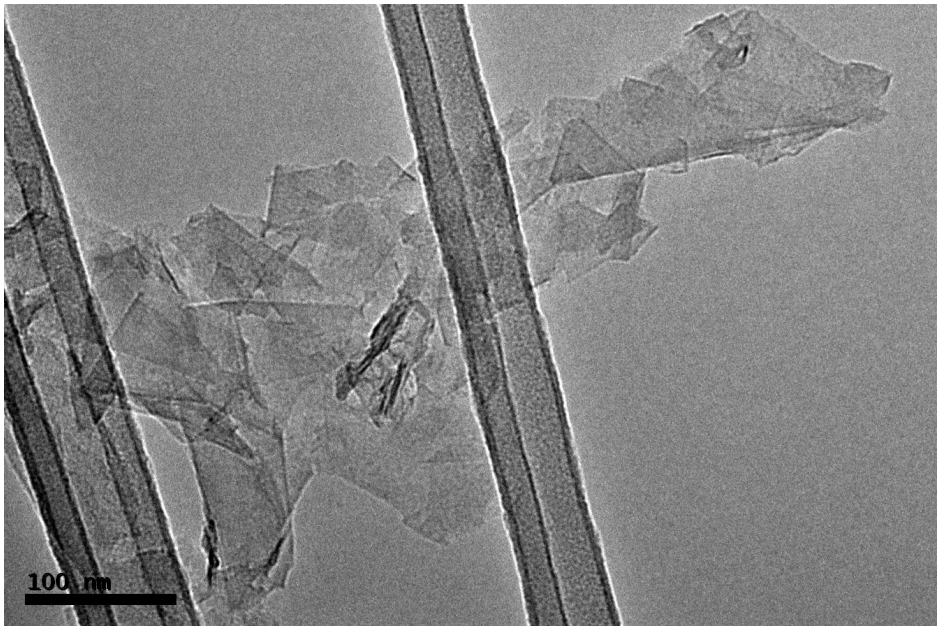


Figure 4. Representative TEM images of Sweet Graphene.

- **Recommendations for use:**

- It must be stored at room temperature.

- The sample is very stable in aqueous solution. It can be even dispersed directly in culture medium (until 0.1 mg/ml) just before using, as it is stable for several hours. Stabilizing agents are not necessary. It is possible to weight the amount of powders needed and disperse them in the necessary volume of solvent to reach the desired concentration.

- Sonication treatment (10 seconds cycles, maximum 2 minutes) are enough to obtain a good dispersion.