

FEW LAYERS GRAPHENE

CHARACTERIZATION OF THE LYOPHILIZED POWDER:

- ❁ **Thermogravimetric Analysis (TGA) - FLG (N₂ -600 °C) = 5.29%**

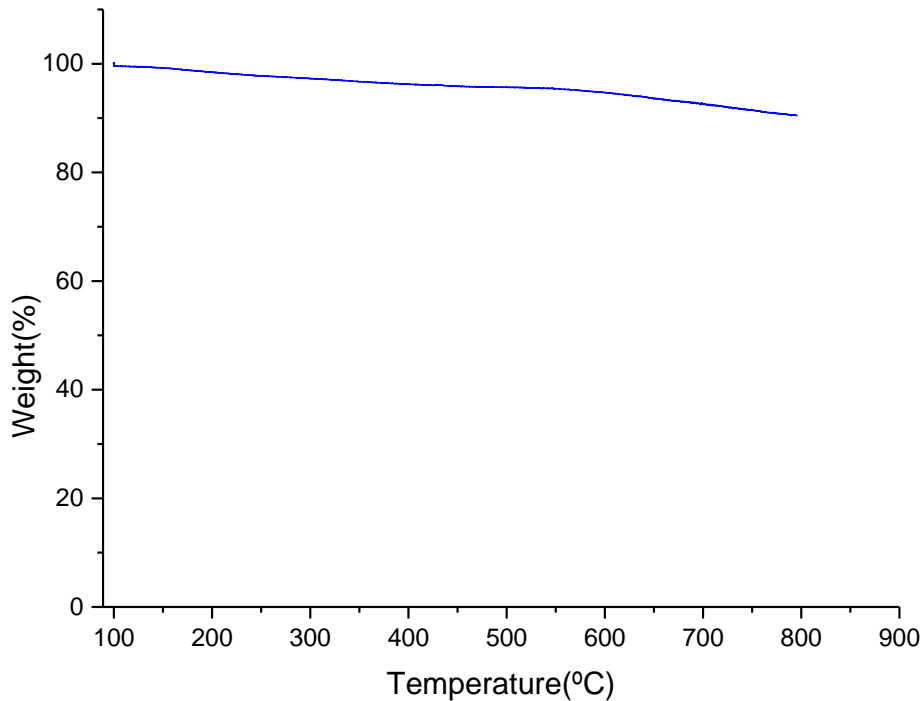


Figure 1. Thermogravimetric analysis of FLG.

- ❁ **Elemental Analysis** (average):

Wt%C = 96.31±0.78 **Wt%H** = 0.27±0.00 **Wt%N** = 0.41±0.03
Wt%S = 0.49±0.03

- ❁ **Sheet Resistance** = 3.16 ± 0.26 Ω/sq

- ❁ **Total Reflection X-ray Fluorescence (TXRF):** 0.172 mg/l Fe

Element	Line	Conc./ mg/l	SigmaA/ mg/l	RSD/ %	LLD/mg/l	Net area	Backgr.	Chi
Si	K12	128.6	1.1	0.8	0.4	21103	581	2.08
S	K12	0.610	0.064	10.5	0.116	367	539	1.27
Cl	K12	0.181	0.034	19.0	0.067	180	486	1.16
K	K12	0.090	0.015	16.7	0.029	196	430	0.82
Ca	K12	0.352	0.016	4.5	0.022	925	380	1.39
Ti	K12	2.600	0.027	1.0	0.015	13032	592	0.76
V (IS)	K12	5.000	0.034	0.7	0.014	31595	857	0.66
Fe	K12	0.172	0.005	2.6	0.004	2093	311	1.41
Cu	K12	0.007	0.001	18.1	0.002	146	274	0.98
Zn	K12	0.089	0.002	2.5	0.002	2154	279	1.45
Br	K12	0.019	0.001	5.1	0.001	737	309	0.65

❁ **Raman spectroscopy:**

- FWHM (2D) = 69.38 cm^{-1}
- I(D)/I(G) = 0.36
- I(2D)/I(G) = 0.42
- Number of layers = 4.5

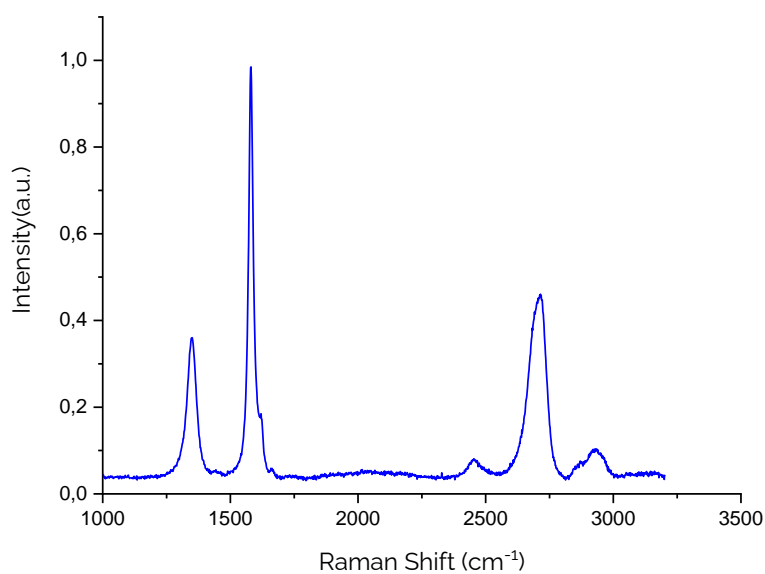


Figure 2. Normalized Raman spectrum of FLG at 532 nm.

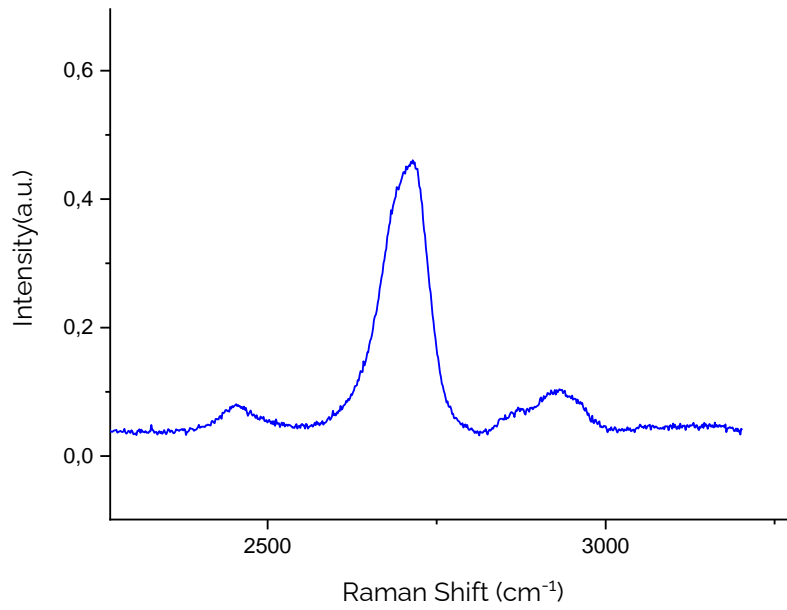


Figure 3. Normalized Raman spectrum of 2D_AFGly2_Ly

❁ **Transmission Electron Microscope (TEM):**

Average size: 300 ± 83 nm

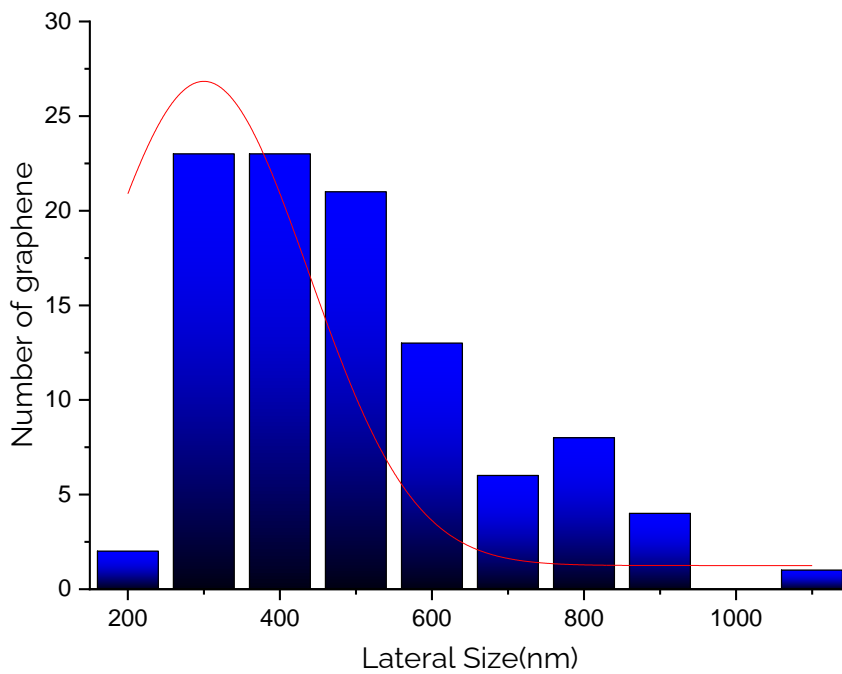
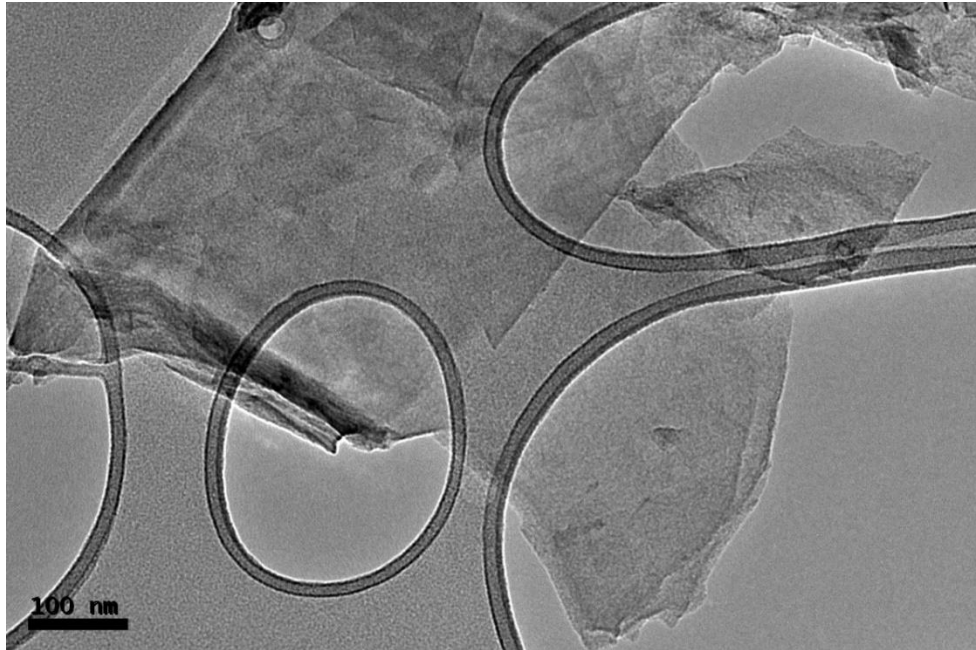


Figure 3. Lateral size distribution of ball-milled graphene from TEM images of FLG.



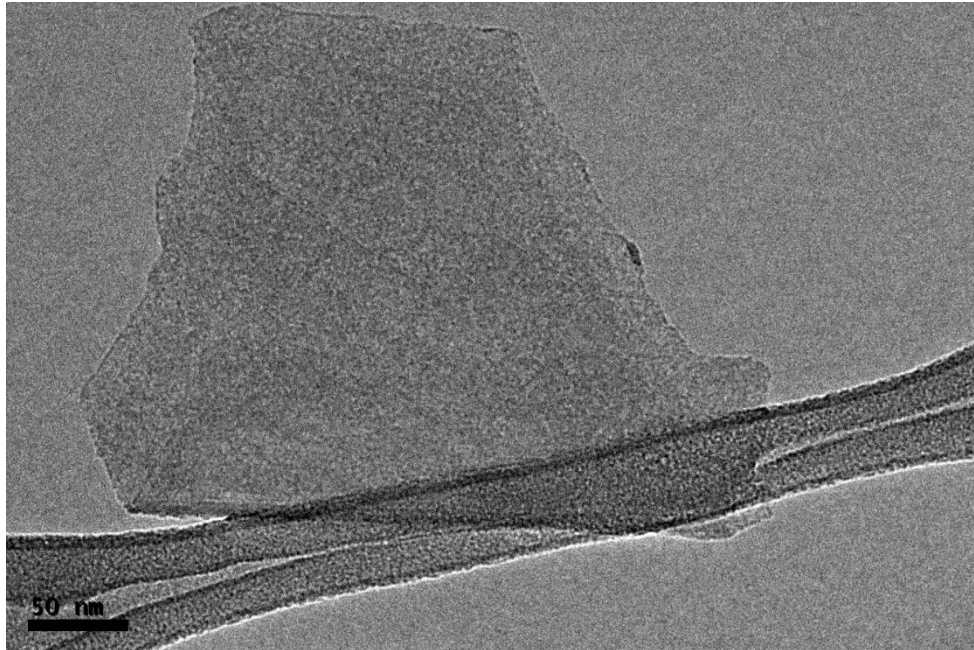


Figure 4. Representative TEM images of FLG.

❁ **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 0.8 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.