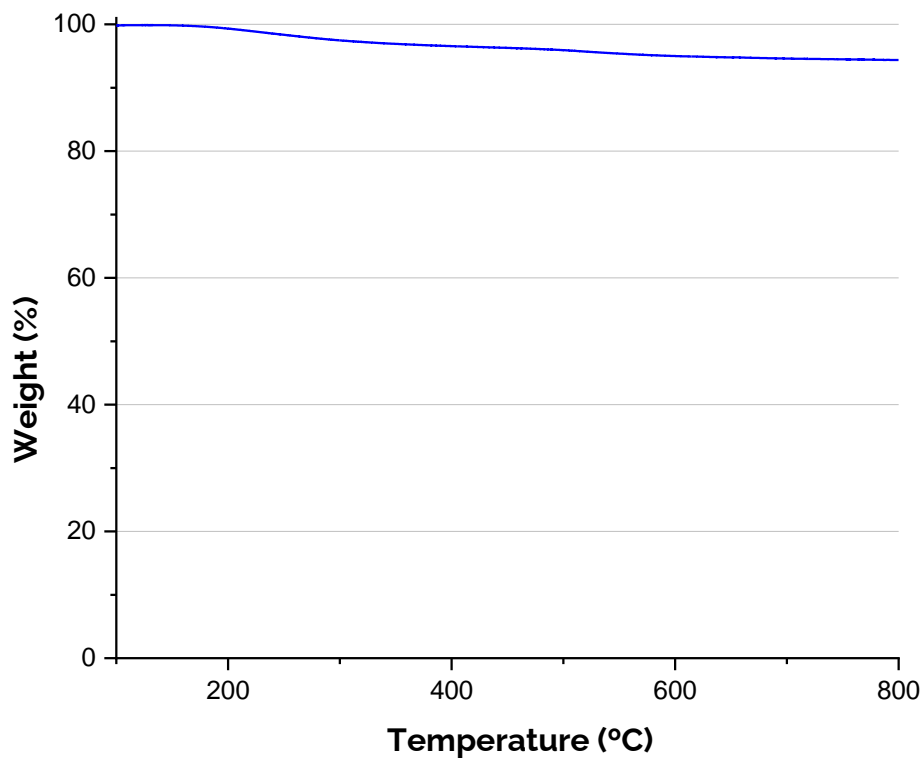


## 2D-WS<sub>2</sub>

### CHARACTERIZATION OF THE LYOPHILIZED POWDER:

- ❁ **Thermogravimetric Analysis (TGA) – 2D-WS<sub>2</sub> (N<sub>2</sub> -600 °C) = 5.5%**



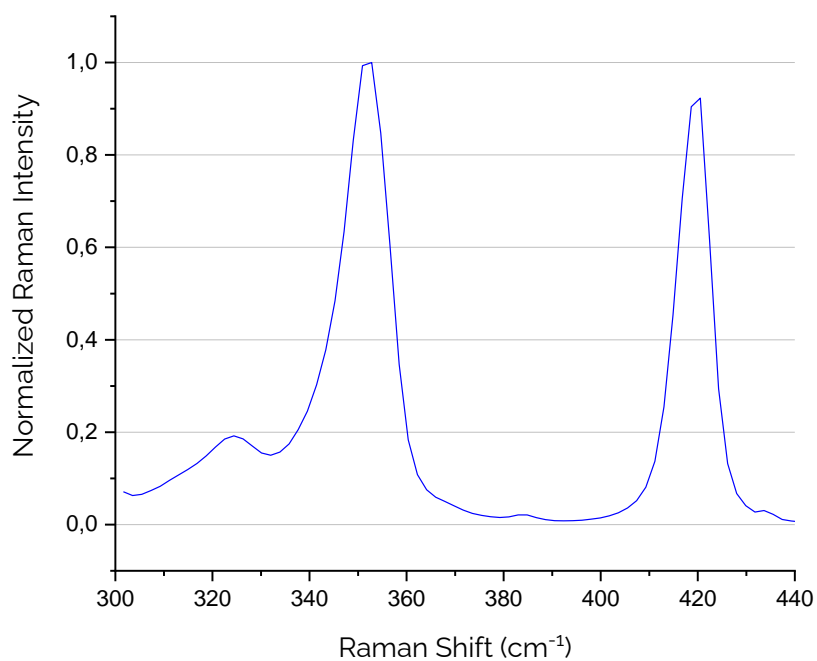
**Figure 1.** Thermogravimetric analysis of 2D-WS<sub>2</sub>.

- ❁ **Elemental Analysis (average):**  
2.13±0.11 Wt%C – 0.66±0.032 Wt%H – 0.85±0.06 Wt%N – 22.82±0.38 Wt%S
- ❁ **Total Reflection X-ray Fluorescence (TXRF):** 0.676 mg/l Fe

Element	Line	Conc./ mg/l	Sigma/ mg/l	RSD/ %	LLD/ mg/l	Net area	Backgr.	Chi
Si	K12	170.4	2.9	1.7	3.1	19150	13589	6.34
S	K12	59.92	0.80	1.3	0.56	24731	6023	1.47
Ca	K12	1.641	0.072	4.4	0.117	2951	4948	1.47
V (IS)	K12	20.00	0.18	0.9	0.05	86562	5739	0.86
Fe	K12	0.676	0.019	2.8	0.027	5633	5492	1.30
Mo	L1	24.05	0.62	2.6	0.83	6748	6048	1.41
W	L1	290.2	1.8	0.6	0.0	3208074	6135	5.83

❁ **Raman spectroscopy:**

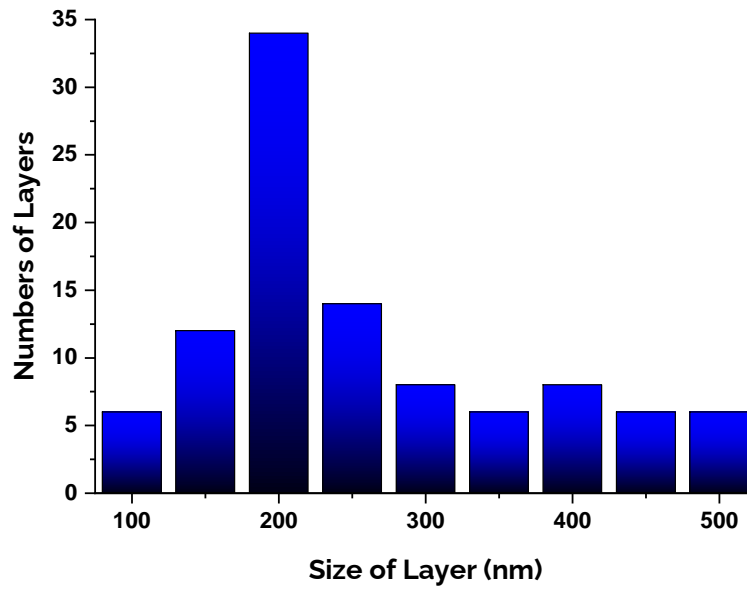
- $E_{2g}^1 = 351.38 \text{ cm}^{-1}$
- $A_{1g} = 417.93 \text{ cm}^{-1}$
- Number of layers = 3



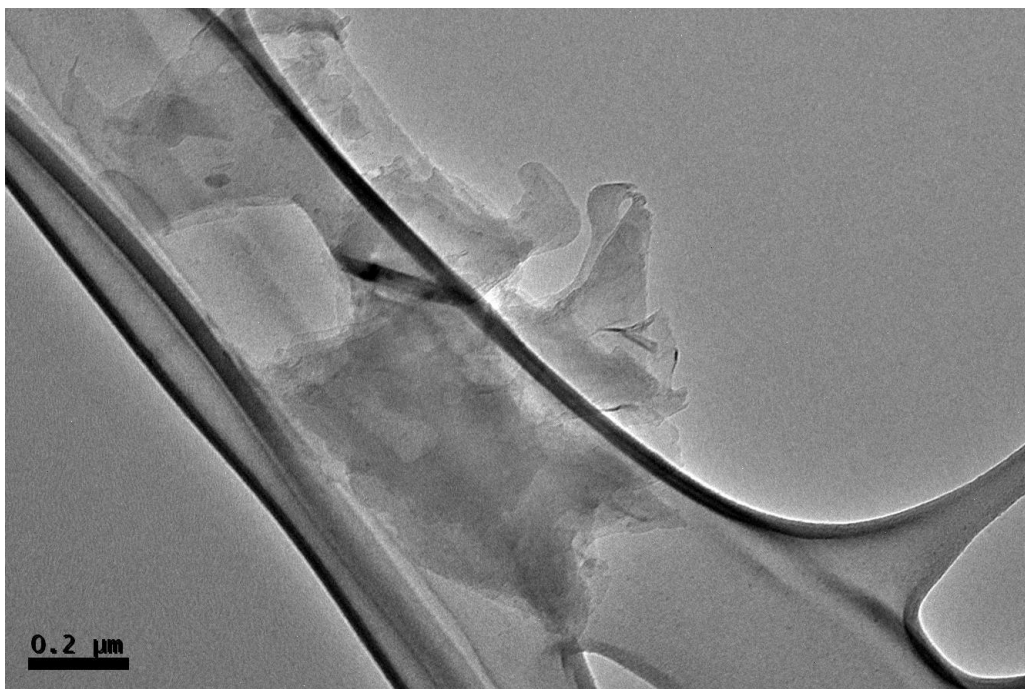
**Figure 2.** Normalized Raman spectrum of 2D-WS<sub>2</sub> at 532 nm.

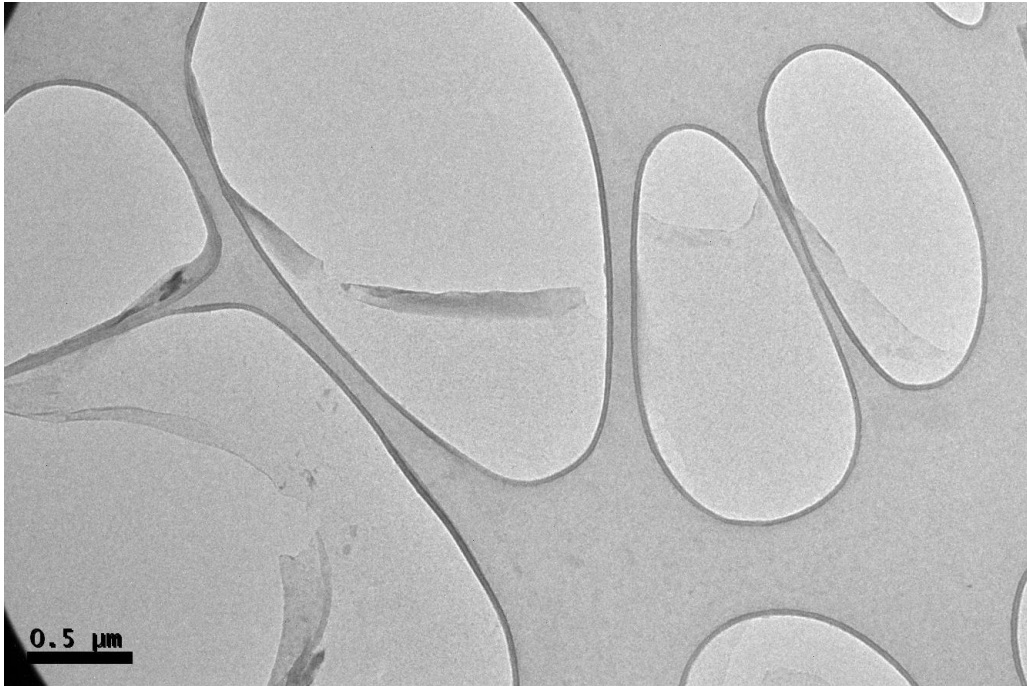
❁ **Transmission Electron Microscope (TEM):**

Average size:  $302.45 \pm 107$  nm



**Figure 3.** Lateral size distribution of ball-milled graphene from TEM images of 2D-WS<sub>2</sub>.





**Figure 4.** Representative TEM images of 2D-WS<sub>2</sub>.

❁ **Recommendations for use:**

- It must be stored at room temperature.
- 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.