

Characterization methods of 2D materials produced by liquid phase exfoliation.

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Technological improvement of 2D, nano, and micro size materials flakes requires establishing statistical characterization methods of large flakes, especially their thickness and lateral size, defects, and chemical composition. Comparison of the results from spectroscopic and microscopic characterization methods should allow the development of a statistical process of verifying the properties of these materials, which will be crucial for developing production and applications.

Different methods of producing 2D materials lead to various properties of the final product and hence the applications. Characterization of selected layered materials before, during, and after the exfoliation process, especially their physical properties such as size and thickness, can be carried out on Raman, UV-Vis and FTIR spectroscopy, SEM, and AFM. Analysis of more advanced structures, such as edge and surface functionalization or intercalated compounds, requires a combination of chemical and physical characterization methods.

This presentation aims to get near the subject of 2D, nano, and micro size materials statistical characterization methods and their combination to find the quick and easy selection of their properties.

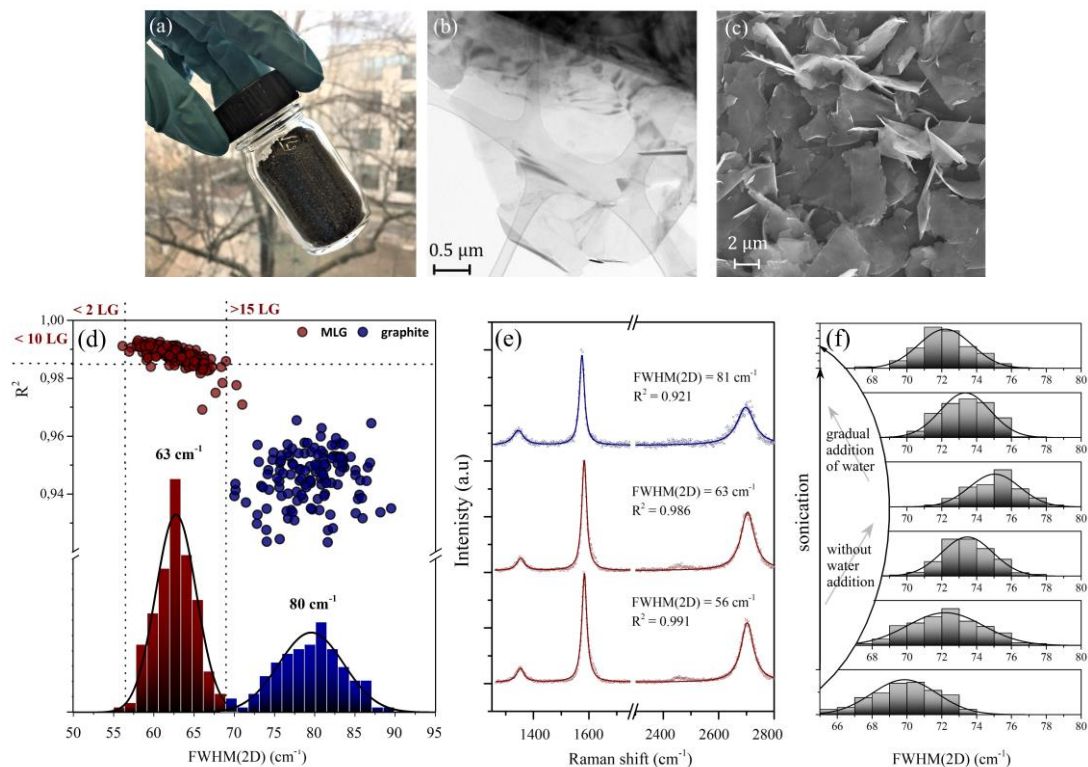


Fig. 1. Gram scale production of nanoflakes and examples of characterization methods: (a) gram-scale production of thin graphene flakes, (b) TEM and (c) SEM images showing topography, size, and estimated thickness of flakes, (d-e) Raman spectroscopy statistical results presented as histograms of FWHM(2D) correlate with a coefficient of determination..