

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 of statistical characterization methods of large numbers of flakes - especially their thickness as well as lateral size, defects and chemical composition. Comparison of the results from spectroscopic and microscopic characterization methods should allow to develop a statistical method of verifying the properties of these materials, which will be crucial for the development of their production and applications. Different methods of producing 2D materials leads to various properties of the final product and hence the applications. Characterization of selected layered materials before, during and after 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 combination of chemical and physical characterization methods.

The aim of this presentation is to get near the subject of 2D, nano and micro size materials statistical characterization methods and their combination in order to find quick and easy procedure of selecting their properties.

References

- [1] Ojrzynska, Milena & Zdrojek, Mariusz & Judek, Jaroslaw & Malolepszy, Artur & Duzynska, Anna & Wroblewska, Anna. (2020). Study of optical properties of graphene flakes and its derivatives in aqueous solutions. *Optics Express*. 28

Figures

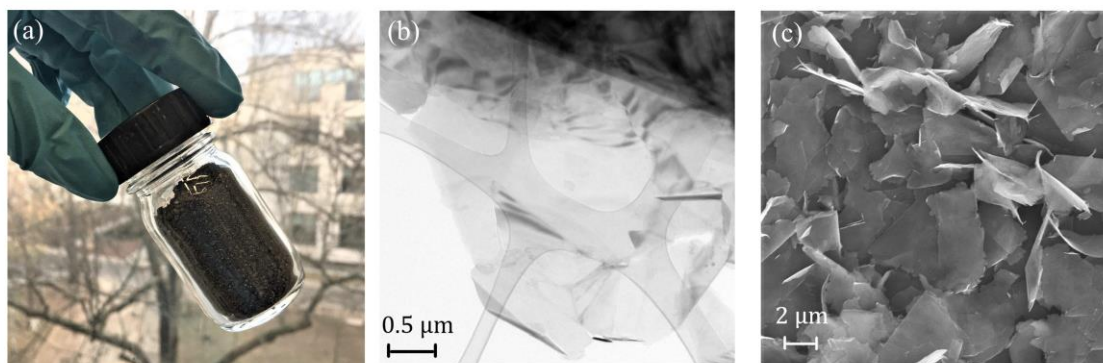


Figure 1: Gram scale production of nano flakes and examples of characterization methods: (a) gram scale sample of thin graphene flakes, (b) TEM and (c) SEM images showing topography, size and estimated thickness of flakes.