

# A novel Technic for Preparation of Graphene from Graphite with Using Mechanical Milling

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## Abstract

In this research we submit a new mechanical milling technic for producing graphene mono & multi-layer from graphite with using sodium chloride as an abrasive material.

Mechanical milling technic is a common method for producing of graphene sheets. Graphite nano sheets was consist of hundreds carbon layers which with mechanical milling and exfoliation of Graphite in different solvents can produce suspend grapheme[1]. The experience of graphene production with mechanical milling technic in DMF solvents and Graphite mechanical milling with melamine was experimented via other researchers too and their results was considerable[2]. Graphene bulk production has so far been very limited and must studies have been carried out using samples prepared by micro mechanical cleavage.

In this method after 20 hours mechanical milling and shear-force-dominated grinding on graphite nano-sheets which mixed with Sodium chloride and final powder washed with water, and in next step after sonication in water and centrifugation in 4000 R.P.M, we reached mono & multi-layer graphene. In this research different ratios between Graphite & Sodium chloride in mechanical milling was evaluated.

The advantage of this method is in addition to production of graphene nano sheets with high production output (achieving a yield higher than 25%), we can mention that used solvent for sonication and washing is JUST WATER which the application of graphene will be easy.

The graph, photos of AFM, TEM and samples UV are shown in next page.

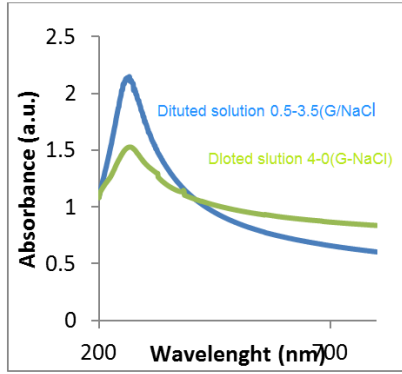
**Key Words:** Graphene, Graphite, Mechanical Milling, Sodium chloride

## References

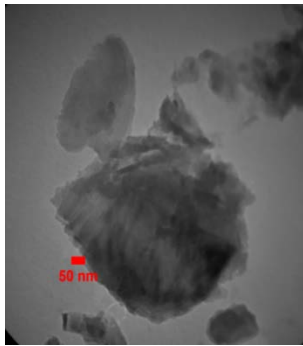
[1] Weifeng Zhao, Furong Wu, Hang Wu and Guohua Chen, Journal of Nano materials, "Preparation of Colloidal Dispersions of Graphene Sheets in Organic Solvents by Using Ball Milling", Volume 2010, Article ID 528235, 5 pages.

[1] Veronica Leao, Mildred Quintana, M. Antonia Herrero, Jose L.G. Fierro, Antonio de la Hoz, Maurizio Prato and Ester Vazquez, "Few-layer graphenes from ball-milling of graphite with melamine", Chem Com, 2011, 47, 10936-10938.

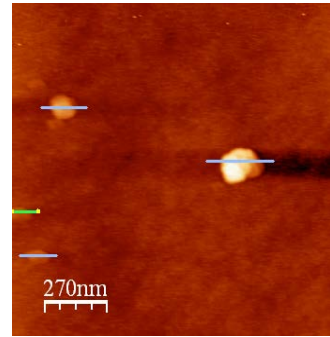
## Figures



UV absorption of graphene obtained with and without NaCl milling



TEM image of graphene sheets



AFM images of graphene sheets

IR:

