

Graphene nanosheets produced by a green liquid phase exfoliation process.

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Abstract

Developed at the laboratory of geophysical and industrial flows (LEGI, University Grenoble Alpes), Grenoble Green Graphenofluids offers graphene nanosheets suspensions. Graphene nanosheets are exfoliated from graphite particles by an innovative microfluidic process using hydrodynamic cavitation 'on a chip' [1, 2]. The quality of exfoliated nanosheets is asserted by SEM, TEM, AFM and Raman analyses. GGG produces graphene nanosheets whose thickness runs from 1 to 10 carbon layers, with an average 150 – 300 nm lateral size. They are delivered in a solution at a concentration between 2g/L and 10 g/L. Exfoliation from aqueous solutions with surfactant, as well as from solvents with surface energy matching those of graphene, have been performed. Aqueous or solvent based suspensions use biodegradable dispersing agents, allowing GGG to be an environmentally compatible process in graphene production. Low hydraulic power is required, so that the low-cost mobile experimental facility is able to produce graphene nanosheets on demand, under the best possible conditions of safety. A review of the graphenofluids produced by such a process and of their intrinsic properties will be presented. We are looking for industrial partners to test the interest of our products for a large scope of applications.

References

- [1] X. QIU, W. CHERIEF, D. COLOMBET and F. AYELA, *J. Micromech. Microeng.* 27(4), (2017) 047001
- [2] X. QIU, V. BOUCHIAT, D. COLOMBET and F. AYELA, *RSC Adv.* 9, (2019) 3232-3238
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Figures

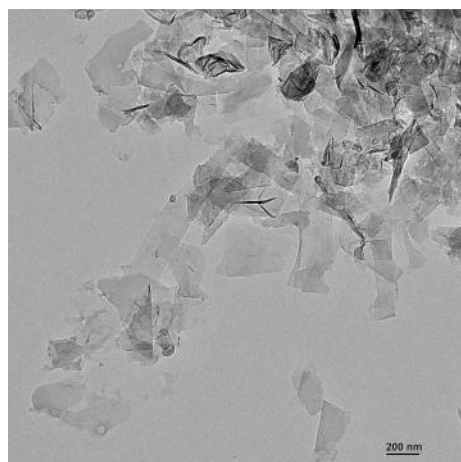


Figure 1: TEM observation of graphene nanosheets produced by GGG. The scale bar is 200 nm.
