Mass production of high quality Graphene

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Abstract

Incubation Alliance Inc. has used a proprietary high-speed CVD process to successfully mass-synthesize graphene without the use of substrates, catalysts, or stripping.[1)] "GRAPHENEFLOWER" (registered trademark) is a mass of graphene that has been grown into individual flower pedal shapes, which together form a unified mass of graphene. GRAPHENE FLOWER dispersions are composed of graphene that has been finely powdered while suppressing the adhesion of the graphene by placing masses of GRAPHENEFLOWER in an organic solvent and storing the powder in the solvent. Dispersions can also be composed of recovered supernatant produced by ultrasonic wave treatment separation and centrifugation of the graphene As a GRAPHENE FLOWER dispersion, it is possible to apply graphene to a variety of applications via coating graphene stabilized in an organic solvent to a substrate, primarily through a wet process, or by dispersing the graphene in a material. In addition, some of the potential production methods for realizing these applications can apply relatively simple general-purpose devices and existing wet process technology. Such approaches could possibly design a resource/energy saving production process with high productivity.

There are many approaches to produce the graphene currently, but almost all process needs some removing process or exfoliation process with very low productivity. Incubation Alliance Inc has made an effort to develop a new production method in order to escalate its application, which is to synthesize nanocarbon materials with high productivity. Our new technology features to perform CVD simultaneously in a full reaction container and can obtain a very high productivity. This method is possible to synthesize graphene with a high productivity, because CVD advances simultaneously and 3dimensionally in a full reaction container, and substrate-free/catalyst-free synthesis are possible. [2)]Graphene Flower is available as a dispersion of 10μm shaped with 1 nm thick graphene, perfect for wet coating of flexible transparent conductive films, heat radiation sheets, lithium-ion battery electrodes, capacitor electrodes, etc.It is also available as a dispersion in the requested solvent, including water, IPA, NMP, PGMEA, etc. and applicable to all printable electronics via spray coating, bar coating, gravure printing, screen printing, etc.[3)]

This development has been supported by Ministry of Economy, Trade and Industry of Japan, "Strategic Foundational Technology Improvement Support Operation 2010-2012."

References

[1] K. Muramatsu and M. Toyoda, EP2436648 (A1)
[2] K. Muramatsu and M. Toyoda,EP2537801 (A1)
[3] K. Muramatsu, K. Sutani and M. Toyoda, Graphene2012 International Conference, Brussels , Belguim, 2012.4.10-13

Figures

Fig.1 Graphene Flower as grown.

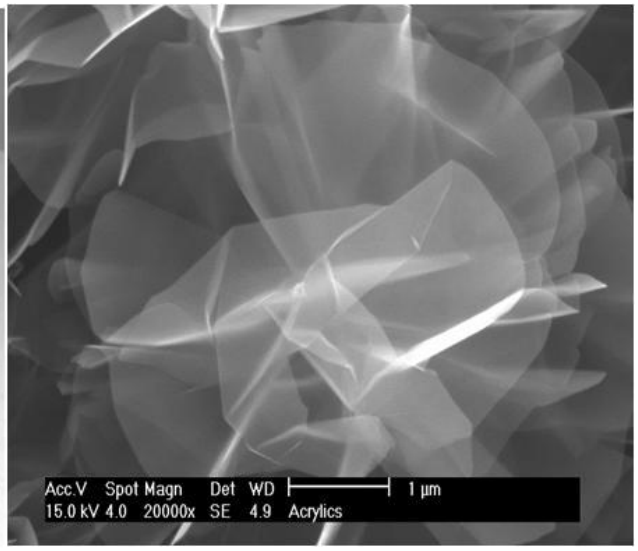

Fig.2 FE-SEM for Graphene Flower surface

Fig3 Graphene Flower Dispersion