C0r0n@ 2 Inspect

Review and analysis of scientific articles related to experimental techniques and methods used in vaccines against c0r0n@v|rus, evidence, damage, hypotheses, opinions and challenges.

Wednesday, July 14, 2021

Graphene oxide in aerosol droplets

Reference

Wang, WN; Jiang, Y .; Biswas, P. (2012). Evaporation-induced crumpling of graphene oxide nanosheets in aerosolized droplets: confinement force relationship. Journal of Physical Chemistry, 3 (21), pp. 3228-3233. https://doi.org/10.1021/jz3015869

Introduction

1. The introduction to the article alludes to the interest of the scientific community in 2D graphene nano-sheets due to their application in drug encapsulation, and it is necessary to develop methods that make the most of their properties. Among the challenges stands out the following: " *The challenges of using these 2D nano-sheets are related to their mass production. A particular problem is the tendency to aggregate (re-stacking) due to the strong adhesion between sheets* ." This problem is partly solved with the technique that is described in the article.
2. The authors seek a solution to " *the problem of repackaging graphene oxide (GO) nanosheets during large-scale production is to convert two-dimensional (2D) nanosheets into wrinkled three-dimensional (3D) balls that have excellent compression properties* ."
3. It is concluded that there are several factors to achieve the graphene oxide repackaging goal, such as evaporation rate and precursor concentration.
4. It is shown that it is possible to achieve the evaporation of graphene oxide nanofilms in aerosol droplets. In fact it is referred to in the following terms " *the aqueous suspension of GO was atomized into fine droplets. The wrinkled GO particles were formed by capillary compression due to the rapid evaporation of the aerosol droplets* ."
5. In the explanation of the experiments carried out, it is explained that an aqueous suspension was made as a precursor for the synthesis of wrinkled GO particles. Subsequently " *the precursor was atomized into micrometer-sized droplets (2 to 4 µm) by a Collison six-jet nebulizer (BGI Incorporated), and the aerosol was delivered by nitrogen gas to an alumina reactor maintained at predetermined temperatures for heating. For several seconds* . "From this text, two important details should be emphasized, firstly, an instrument called" Collison nebulizer "is mentioned, see figure 1. Secondly, the size of the aerosol droplets that vary from 2 to 4 micrometers.

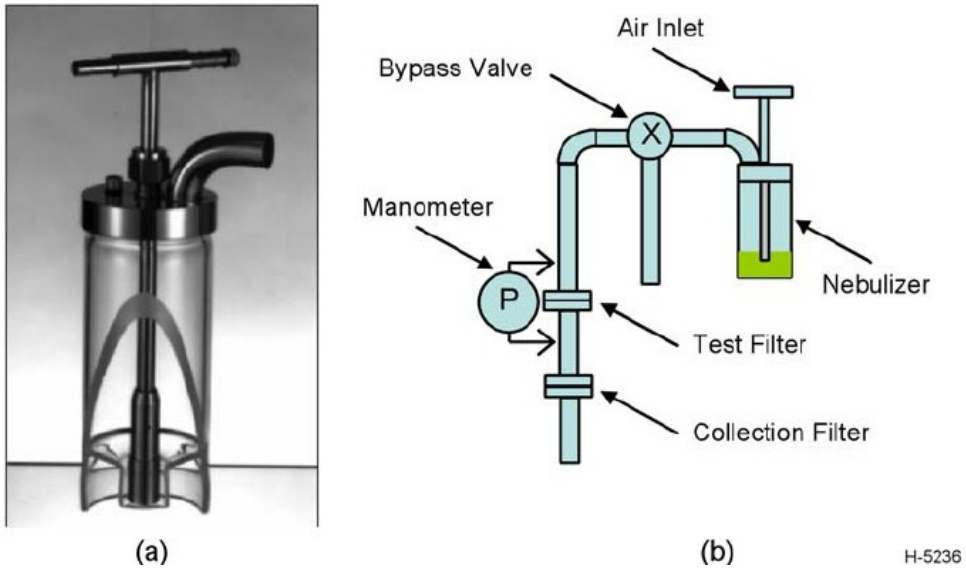
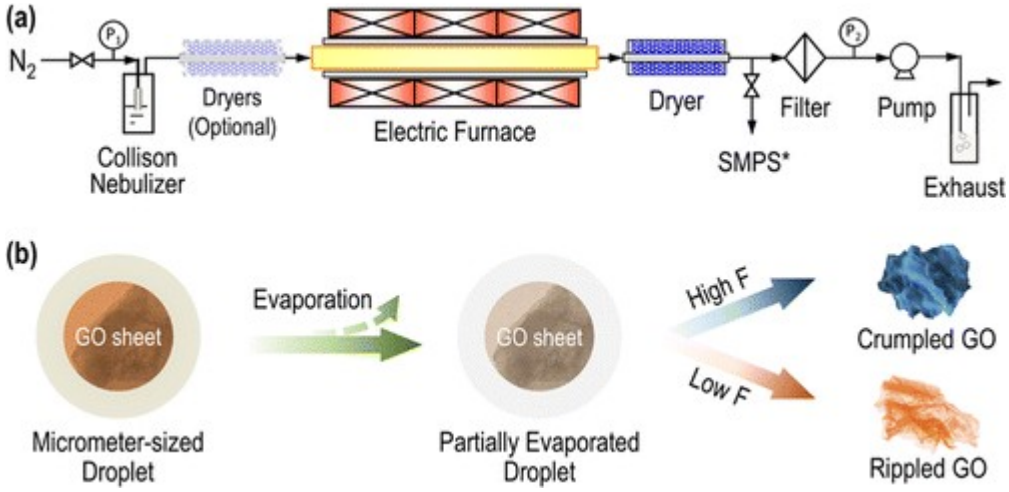


Fig. 1. Collison nebulizer and its parts

The nebulization procedure is also indicated, detailed in figure 2.



6. The result of this refolding and nebulization process could be photographed, obtaining the following images in figure 3.

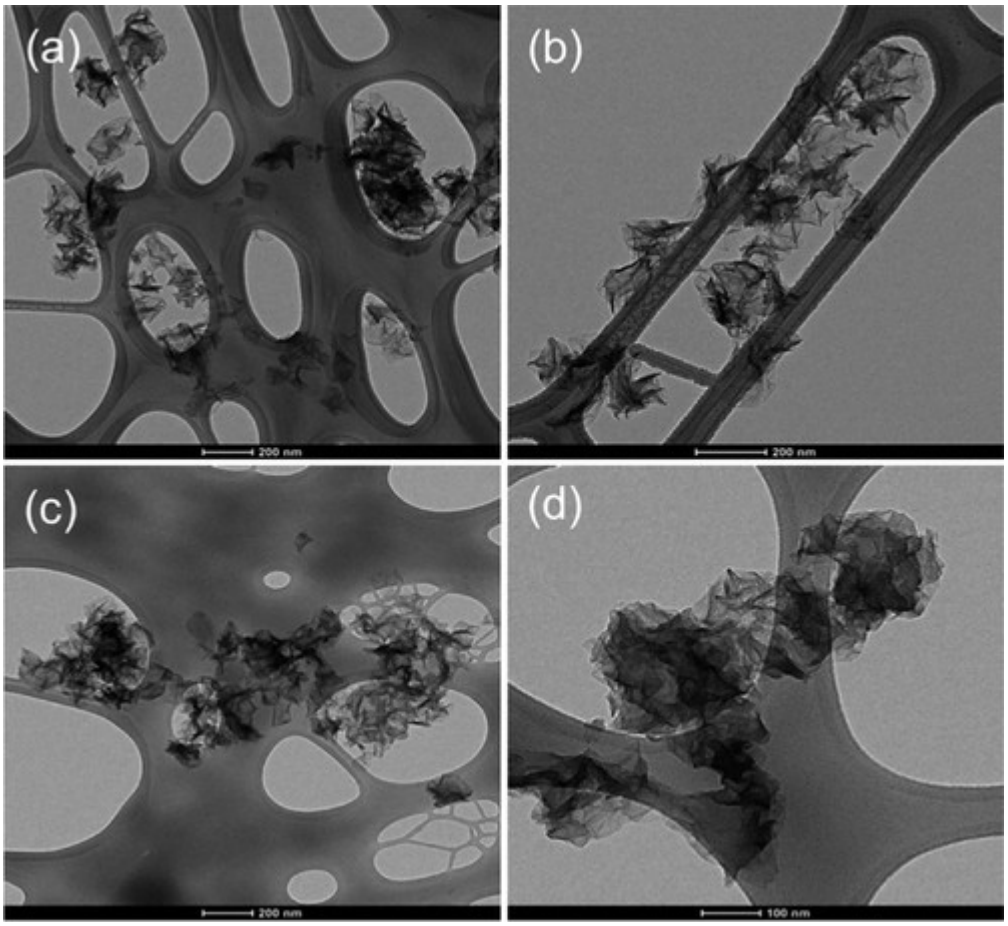


Fig. 3. GO particles wrinkled as a function of pH

7. If the image in figure 3 is compared with the results obtained by (Campra, P. 2021), the evident similarity of graphene oxide and its potential configuration for its diffusion cannot be denied, see in figure 4 one of your study samples.

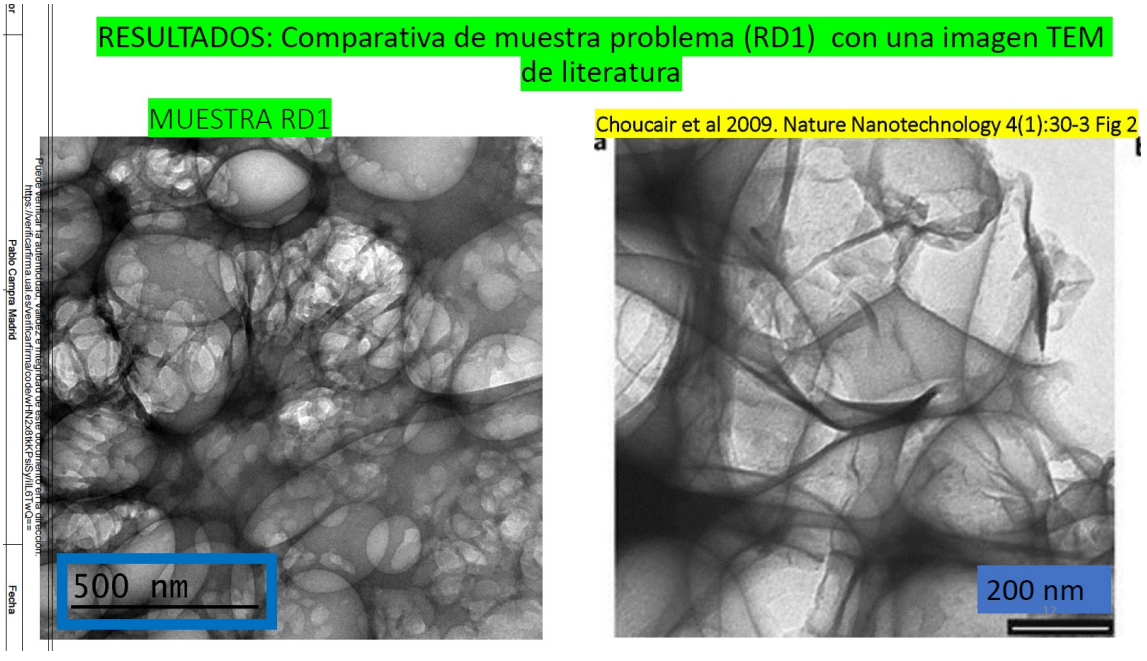


Fig. 4 RD1 sample obtained by Campra and compared with the scientific literature

Reviews

1. The aforementioned publication is irrefutable proof of the work to ensure that graphene oxide can be disseminated through aerosols. The droplet size is small enough (2 to 4 microns) to potentially penetrate any mask (Sharma, S.; Pinto, R.; Saha, A.; Chaudhuri, S.; Basu, S. 2021).
2. The date of the research, which dates back to 2012, is very striking, which reflects the interest in developing methods that facilitate the dissemination, folding and above all, the mass production of the material.
3. Graphene oxide "GO" can be prepared in the form of an aerosol and spread through any vector with adapted nebulizers, so that anyone could inhale it. The article recognizes the possible applications in biomedicine for the administration of inhaled drugs, given the carrier capacity of GO, a property demonstrated in patent CN112220919A already discussed in a previous entry

Bibliography

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3. Sharma, S .; Painter .; Saha, A .; Chaudhuri, S .; Basu, S. (2021). On secondary atomization and blockage of surrogate cough droplets in single-and multilayer face masks. Science advances, 7 (10). https://doi.org/10.1126/sciadv.abf0452