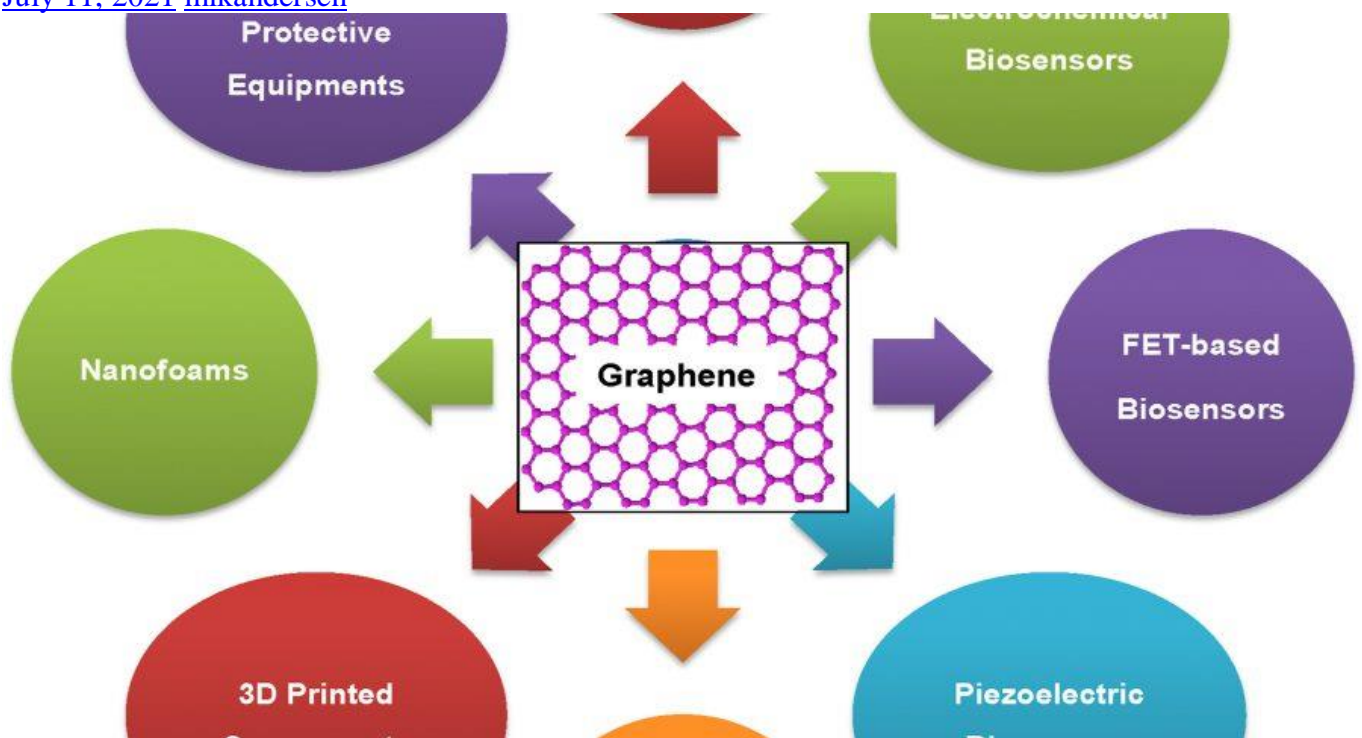


Graphene-based materials to combat COVID-19

July 11, 2021 [mikandersen](#)



Reference

- Srivastava, AK, Dwivedi, N., Dhand, C., Khan, R., Sathish, N., Gupta, MK, ... & Kumar, S. (2020). Potential of graphene-based materials to combat COVID-19: properties, perspectives and prospects. *Materials Today Chemistry*. <https://doi.org/10.1016/j.mtchem.2020.100385>

Facts

- The article exposes the experimentation with materials derived from graphene for the treatment of viral diseases, specifically COVID-19, its properties and most outstanding characteristics. In section 7 of the article, “ *Graphene based on gene editing technology* ” is expressed verbatim , in which graphene acts as a “ *Field Effect Transistor* ”, this is like a circuit, given its magnetic properties to facilitate detection. of the genetic sequences that must be edited, using the CRISPR-Cas9 technique.
- In section 8 of the article, the possibility of manufacturing medical components (masks, respirators, facial protectors...) with graphene-based materials and components is indicated. The authors attribute the ability to kill the SARS-CoV-2 virus, which would justify its use in this type of product. This is developed in successive sections. These statements about the suitability of graphene contrast with the news of the withdrawal of masks with graphene, see (Izarra, J. 2021 | Viejo, M. 2021).
- The applications of graphene in masks and sanitary utensils are opposed to dozens of articles that expose serious risks to the health of people and laboratory animals that are the object of experiments. For example, according to (Jastrzębska, AM; Kurtycz, P.; Olszyna, AR 2012) « *Graphene oxide at low doses did not show obvious toxicity to mice, but at high doses it showed chronic toxicity, causing significant pathological changes, such as the formation of granulomas, mainly located in the lungs, kidneys, liver and spleen*«. On the other hand, according to (Vallabani, NV; Mittal, S.; Shukla, RK; Pandey, AK; Dhakate, SR; Pasricha, R.; Dhawan, A. 2011) graphene is a toxic component for lung cells, causing apoptosis or programmed cell death or cell degeneration. Another study (Chen, L.; Hu, P.; Zhang, L.; Huang, S.; Luo, L.; Huang, C. (2012) indicates the inhibition of cell growth in human cells of 20% and effects of acute toxicity (even in low concentrations) for the development of the embryos, causing severe morphological

defects. The review by (Rhazouani, A.; Gamrani, H.; El Achaby, M.; Aziz, K.; Gebrati, L. ; Uddin, MS; Aziz, F. 2021) indicates that «*The studies carried out to date indicate that the toxicity of GO could depend on its size, synthesis methods, route of administration and exposure time* » and warns of the cell damage that can be caused by the application of graphene oxide, in the context of the respiratory system , digestive, urinary, central nervous, reproductive, as well as " *genotoxic* " properties, this is the ability to cause DNA damage or interact with DNA replication enzymes causing mutations that may or may not lead to cancer. More evidence can be found in the following search

<https://scholar.google.com/scholar?q=intitle%3A%22graphene%22+%22human%22+intitle%3A%22toxicity%22>

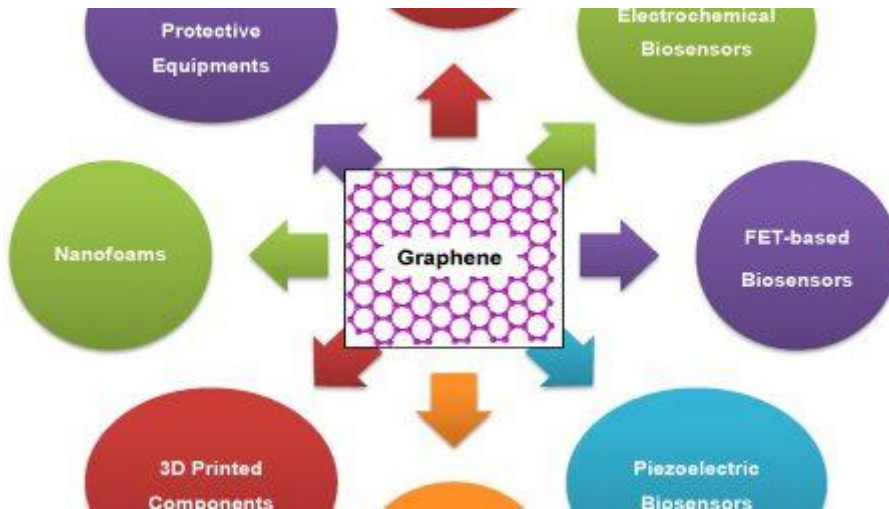


Fig.1. Applications and uses of graphene in the biomedical context. (Srivastava, AK; Dwivedi, N.; Dhand, C.; Khan, R.; Sathish, N.; Gupta, MK; Kumar, S. 2020)

Opinions

- The toxic properties of graphene derivatives are known, at least since 2011, as it appears in the consulted literature. This means that those responsible for the research and production of vaccines were perfectly aware of the properties of this material, its interaction and problems in the body of laboratory animals and by extension in people.
- If researchers know the danger of graphene oxide, it is worth asking why it is used extensively in vaccines in a proportion of 747 ng/ul versus 6ng/ul of RNA, as indicated in the study by (Campra, P. 2021) or what is the same, why is the concentration of graphene oxide clearly higher than a low dose that would not cause toxicity problems? Why has the manufacture of masks and sanitary utensils with these materials been allowed?
- It would be necessary and advisable to prepare a list of products that contain graphene, as well as their laboratory analysis, in order to determine the danger to people's health, real composition and degree of toxicity.

Bibliography

1. Campra, P. (2021). [Report]. Detection of graphene oxide in aqueous suspension (Comirnaty™ RD1): Observational study in light and electron microscopy. University of Almeria. <https://docdro.id/rNgtxyh>
2. Chen, L.; Hu, P.; Zhang, L.; Huang, S.; Luo, L.; Huang, C. (2012). Toxicity of graphene oxide and multiwalled carbon nanotubes against human cells and zebrafish. *Science Chinese Chemistry*, 55(10), p. 2209-2216. <https://doi.org/10.1007/s11426-012-4620-z>
3. Izarra, J. (2021). [Query 2021-04-15]. The Basque Country and Castilla y León withdraw the Canadian graphene masks distributed among health workers, teachers and police. *The world*. <https://www.elmundo.es/pais-vasco/2021/04/14/6076cad221efa099718b45d3.html>

4. Jastrzebska, AM; Kurtycz, P.; Olszyna, A. R. (2012). Recent advances in graphene family materials toxicity investigations. *Journal of Nanoparticle Research*, 14(12), 1-21. <https://doi.org/10.1007/s11051-012-1320-8>
5. Rhazouani, A.; Gamrani, H.; El Achaby, M.; Aziz, K.; Gebrati, L.; Udin, MS; Aziz, F. (2021). Synthesis and Toxicity of Graphene Oxide Nanoparticles: A Literature Review of In Vitro and In Vivo Studies. *BioMed Research International*, 2021. <https://doi.org/10.1155/2021/5518999>
6. Srivastava, AK; Dwivedi, N.; Dhand, C.; Khan, R.; Sathish, N.; Gupta, MK; Kumar, S. (2020). Potential of graphene-based materials to combat COVID-19: properties, perspectives and prospects. *Materials Today Chemistry*. <https://doi.org/10.1016/j.mtchem.2020.100385>
7. Vallabani, NV; Mittal, S.; Shukla, R.K.; Pandey, AK; Dhakate, SR; Pasricha, R.; Dhawan, A. (2011). Toxicity of graphene in normal human lung cells (BEAS-2B). *Journal of biomedical nanotechnology*, 7(1), p. 106-107. <https://doi.org/10.1166/jbn.2011.1224>
8. Old, M. (2021). [Query 2021-04-15]. The Madrid City Council withdraws 500,000 masks with graphene. *The country*. <https://elpais.com/espana/madrid/2021-04-15/el-ayuntamiento-de-madrid-retira-500000-mascarillas-de-grafeno.html>