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.

Thursday, July 22, 2021

Graphene oxide also absorbs 2G, 3G, 4G and 5G

Reference

Ameer, S .; Gul, IH (2016). Influence of reduced graphene oxide on effective absorption bandwidth shift of hybrid absorbers. PLoS One, 11 (6), e0153544.
https://doi.org/10.1371/journal.pone.0153544

Introduction

1. Given the importance of the evidence on the electromagnetic absorption of graphene oxide GO around 5G , it is essential to dig deeper to know what other ranges of the electromagnetic spectrum could be absorbed.
2. The electromagnetic spectrum is the energetic distribution of electromagnetic waves. In the case of absorption studies, the "absorption spectrum" of the material is measured, in this case graphene oxide GO. To study the electromagnetic spectrum, it is usually divided into ranges / segments / bands that allow the waves to be classified with their different frequencies, according to their uses or applications. A radio frequency band is a part of the frequency section of the radioelectric spectrum that is commonly used for radio communications, used to facilitate tuning and avoid interference between the transmitter and receiver thereof.
3. According to the information disseminated through some media (Iglesias-Fraga, A. 2020), the 5G radio spectrum is organized around the 700MHz bands (corresponding to 694-790MHz for DTT television, a band below 1GHz), 1500MHz (intended for 5G that to 1427-1530MHz corresponds), 2600MHz, 2.6GHz and 26GHz (for specific situations, not referred to in the article).

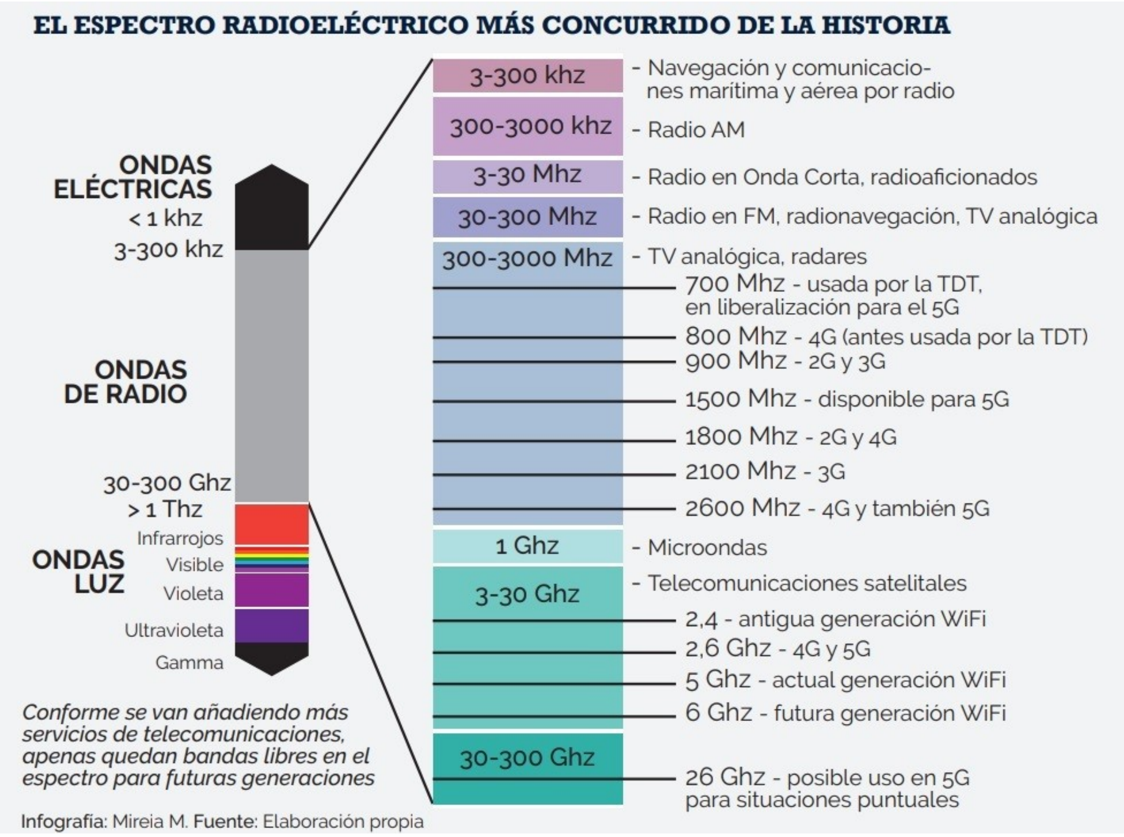

Fig. 1. Radio spectrum scheme

4. If you look at BOE number 198 of July 21, 2020, pages 54731 to 54762 , the National Frequency Attribution Chart (CNAF) will be better developed, already presented in the diagram in figure 1, where the bands and frequencies that 5G will use. However, it is observed and verified which specific situations concern the 26GHz band. Unfortunately the explanation is as concise as the following " for emissions with experimental purposes ".
5. Looking for information on the applications of the 26GHz band, there are direct allusions in the Recovery, Transformation and Resilience Plan published on June 16, 2021 (Government of Spain. 2021) in which it specifies that the tender for said bands will take place in the " second half of 2022 ". Also refers to the following "Regarding the 26 GHz band, in June 2019, a public consultation was carried out, where no special interest was detected on the part of the agents to carry out deployments in that band. However, work is being done to prepare the band for 5G and to hold meetings with sector agents with possible interest in the band. Likewise, there has been an incentive for the development of use cases for the 26 GHz band within the pilot projects. For this, agents can request the temporary use of the spectrum since there is 1 GHz available that is already available for use in 5G. The 26 GHz frequency band will be made available through public bidding and open procedure of concessions for private use of the radioelectric public domain, respecting the principles of publicity, concurrence and non-discrimination for all interested parties."This text is particularly relevant due to its contradictions. On the one hand, the 26GHz band is downplayed, alluding to the lack of interest, but on the other hand, its use is being encouraged for undefined pilot projects. Certain are experimental, their future bidding is not understood, since they would not fall within the scope of commercial exploitation, given their "experimental" nature.

6. Continuing with the search for information on the 26GHz band, the existence of the (National 5G Observatory. 2020) and its report on the standardization and deployment of 5G are discovered. It is observed that the limits of the band are established between 24.25 and 27.5 GHz to which a high transmission speed is attributed and, as a disadvantage, a limited range of a few kilometers. In this publication, according to BEREC (Body of European regulators of electronic communications) " *can be raised that there will be general authorizations in higher bands (66-71 GHz) and individual authorizations in the intermediate band (26 GHz). In both that the final environments of use may not be fully defined, the mechanisms spectrum market will provide greater flexibility so that authorizations are tailored to the specific needs of each market associated with 5G services* . "This shows that the intermediate 26GHz bands will be authorized in a more restricted way. Authorization is also worrisome. General high bands from 66 to 71 GHz, given the absorbing effects of graphene oxide, already mentioned above . It is also observed how the rest of the bands have been distributed, see figure 2. This allows us to infer that the true revolution of the radioelectric spectrum will occur when the 26GHz band frequencies are auctioned, given the amount available without allocating.

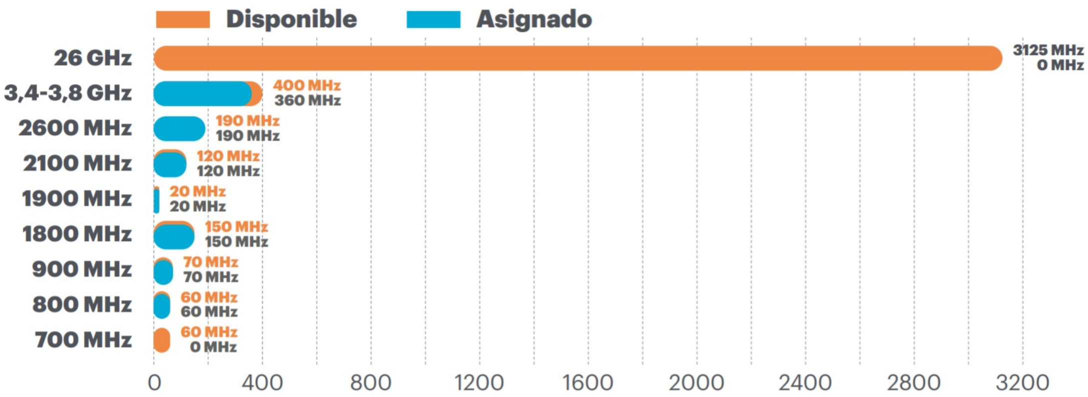

Fig. 2. Spectrum assigned in Spain by frequency bands. Source (National Observatory 5G. 2020)

In reading the report, one of the possible uses of the 26GHz intermediate band is cited for the first time. It is explained as follows " ". This paragraph is interesting for linking Critical Machine-Type Communication (cMTC) services with 5G technology. It deals with factory automation, remote control of equipment, autonomous vehicles, automated manufacturing processes, intelligent transportation, network intelligent electricity, what is known as the smart-grid or the intelligent network.*On the other hand, in relation to the absence of a sufficiently consolidated industry, 5G will allow the development of so-called Critical Machine-Type Communication (cMTC) services, with high-quality and low-latency features, which will be crucial for the digitization of the sectors. industrial. We also advocate for extending the obvious benefits of 5G technology to the industry in our country. In this case the 26 GHz band is the key. We consider it beneficial to continue reserving the allocation of spectrum in this band to telecommunications operators in exchange for their true and ambitious commitment to provide offers to all vertical sectors as they demand them*.

Facts

1. Returning to the analysis of the article referred to for this entry, Ameer and Gul use a hybrid absorbent nanomaterial or $NiFe_2O_4$-rGO. The reduced graphene oxide rGO helped the $NiFe_2O_4$ ferrite compound to complete the absorption bandwidth and to work with a wider frequency range. This makes the magneto-dielectric properties of the nanomaterial, allow a " *high absorption of microwaves in the region of low frequency (mixed L and S bands) that can cover its entire bandwidth* "
2. The graphene sheets synthesized in the material " *have a high oxygen content (about 42%) bonded with individual carbon layers* ." This data is particularly important if its interaction with the human body is conceived, due to the damage that it can cause due to its oxidation. The appearance of the material under microscopy is the one that appears in figure 3.

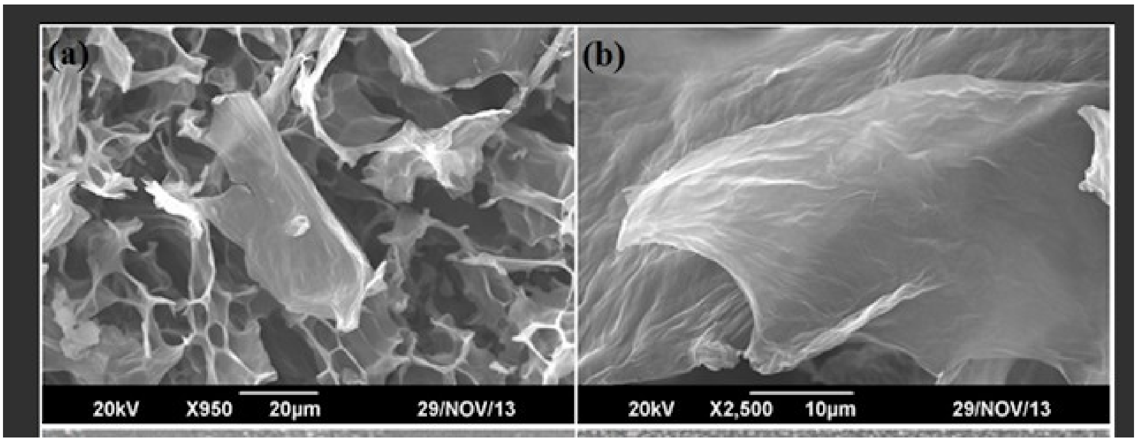

Fig. 3. Sample nanomaterial of $NiFe_2O_4$-rGO

3. The article concludes that the $NiFe_2O_4$-rGO nanocomposite can operate in the *1MHz - 3GHz* spectrum , fitting perfectly with the 5G electromagnetic spectrum, but also with the other 2G, 3G and 4G bands. The authors refer to it as follows: "*Microwave magneto-dielectric spectroscopy was performed in the low frequency region in the 1MHz-3GHz spectrum. The synthesized pristine nanoparticles and hybrids were found to be highly absorbent for microwaves in all L and S radar bands (<−10 dB from 1 MHz to 3 GHz). This excellent property of microwave absorption induced by the coupling of graphene sheets shows the application of these materials with an absorption bandwidth that is adapted so that they can be used for low frequencies* "

Other studies

1. Zhang, D.; Chai, J.; Cheng, J.; Jia, Y.; Yang, X.; Wang, H.; Cao, M. 2018)
   - **Materials analyzed**
     - Reduced Graphene Oxide Coated Molybdenum Disulfide MoS_2 / rGO
   - **Optimal operating frequencies**
     - 4.64-18 GHz
   - **Microscopy images**

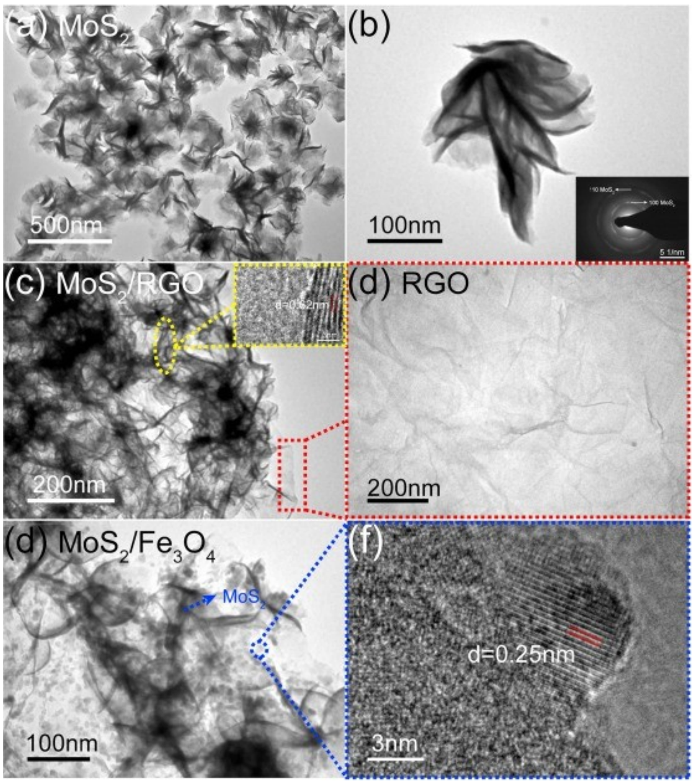

Fig. 4. Materials analyzed in transmission electron microscope (Zhang, D.; Chai, J.; Cheng, J.; Jia, Y.; Yang, X.; Wang, H.; Cao, M. 2018)

2. (Hu, J .; Shen, Y .; Xu, L .; Liu, Y. 2020)
   - **Materials analyzed**
     - Manganese dioxide coated with reduced graphene oxide Mn O 2 / rGO
   - **Optimal operating frequencies**
     - 8-12 GHz
   - **Microscopy images**

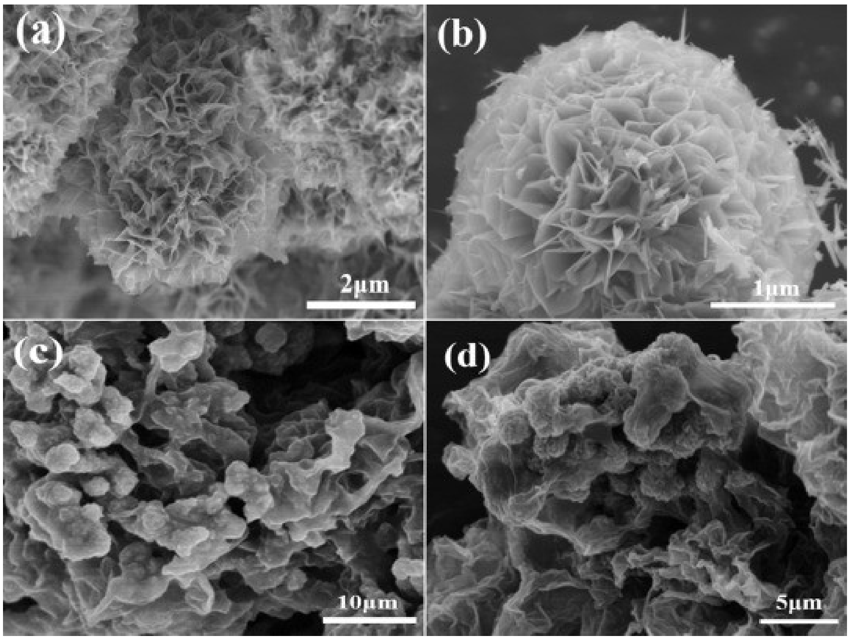

Fig. 5. Flower-shaped reduced graphene oxide nanosheets (Hu, J .; Shen, Y .; Xu, L .; Liu, Y. 2020)

3. (Ren, F .; Zhu, G .; Ren, P .; Wang, K .; Cui, X .; Yan, X. 2015)
    - **Materials analyzed**
        - Cobalt ferrite filled with CoFe 2 O 4 / rGO reduced graphene oxide nanofilms
    - **Optimal operating frequencies**
        - 8.2-12.4 GHz
    - **Microscopy images**

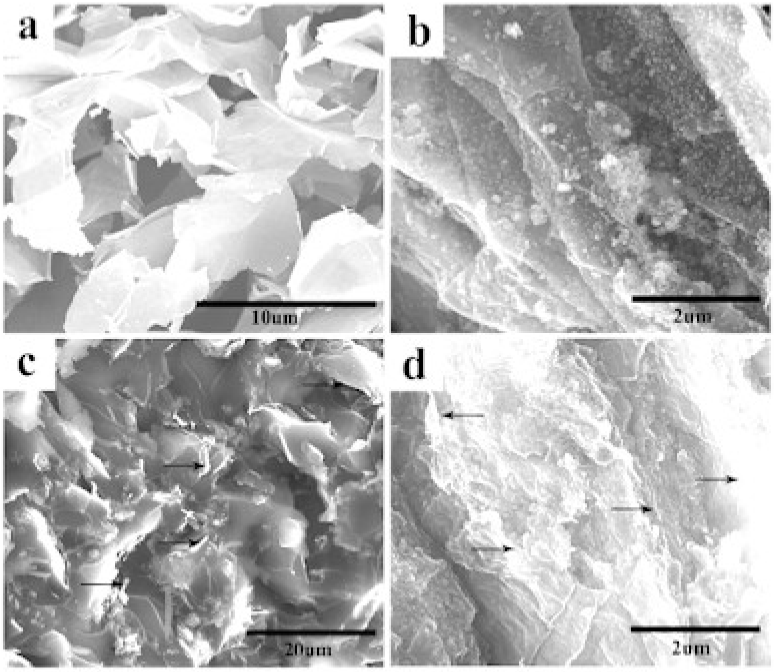

Fig. 6. Nanohybrid compounds with reduced graphene oxide (Ren, F .; Zhu, G .; Ren, P .; Wang, K .; Cui, X .; Yan, X. 2015)

4. (He, L .; Zhao, Y .; Xing, L .; Liu, P .; Wang, Z .; Zhang, Y .; Du, Y. 2018)
    - **Materials analyzed**
        - FCI / rGO reduced graphene oxide coated flaky carbonyl iron
    - **Optimal operating frequencies**
        - 2-18 GHz
    - **Microscopy images**

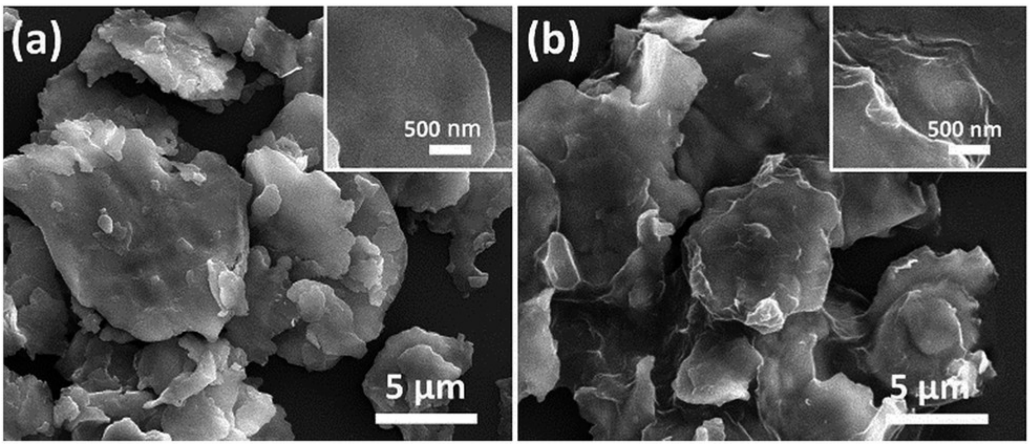

Fig. 7. RGO-coated scaly carbonyl iron (He, L .; Zhao, Y .; Xing, L .; Liu, P .; Wang, Z .; Zhang, Y .; Du, Y. 2018)

5. (Ma, E .; Li, J .; Zhao, N .; Liu, E .; He, C .; Shi, C. 2013)
    - **Materials analyzed**
        - Magnetic Iron Oxide Coated Reduced Graphene Oxide rGO / Fe_3O_4
    - **Optimal operating frequencies**
        - 14.3-18 GHz
    - **Microscopy images**

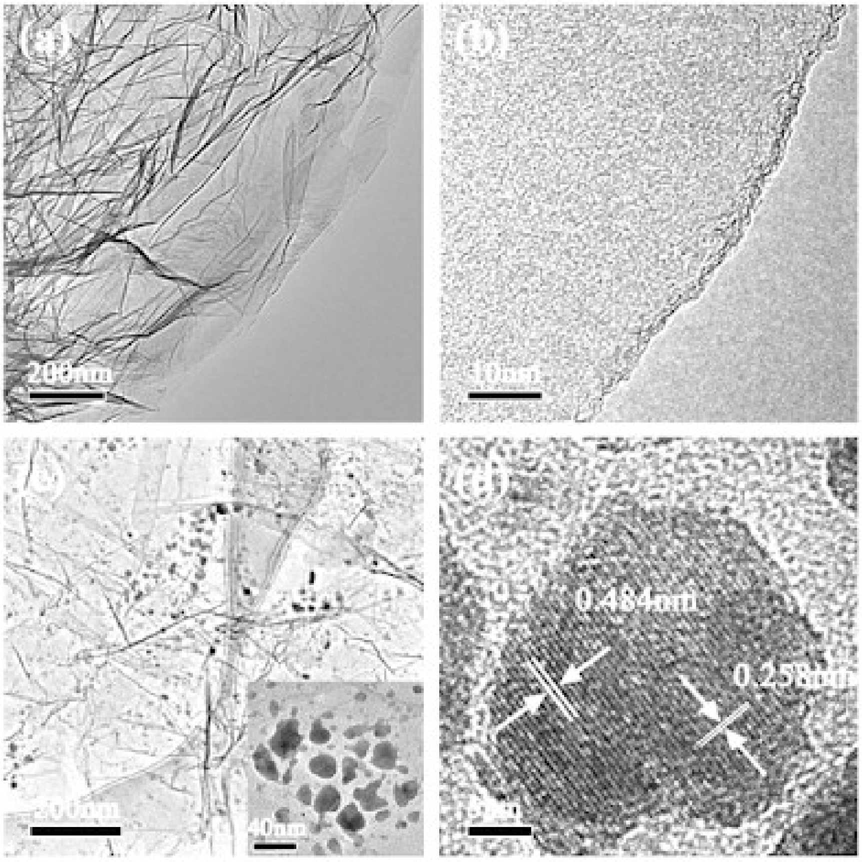

Fig. 8. Magnetite-coated graphene oxide (Ma, E .; Li, J .; Zhao, N .; Liu, E .; He, C .; Shi, C. 2013)

6. (Sudeep, PM; Vinayasree, S .; Mohanan, P .; Ajayan, PM; Narayanan, TN; Anantharaman, MR 2015)
    - **Materials analyzed**
        - Graphene oxide GO, Fluorinated graphene oxide FGO, Highly fluorinated graphene oxide HFGO
    - **Optimal operating frequencies**
        - S Band (2GHz to 4GHz), X Band (8GHz to 12GHz)
    - **Microscopy images**

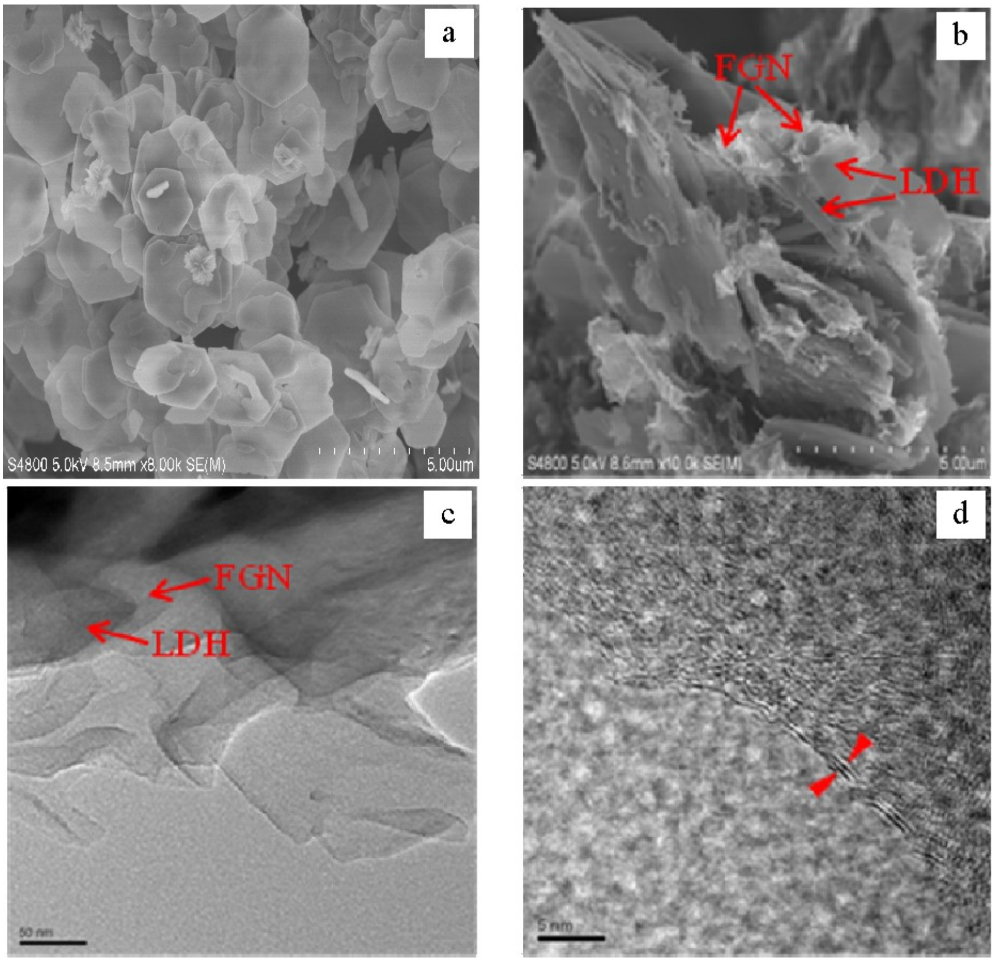

Fig. 9. Example of fluorinated graphene oxide (Peng, W .; Li, H .; Song, S. 2017)

7. (Quan, L .; Qin, FX; Estevez, D .; Lu, W .; Wang, H .; Peng, HX 2019)
   - **Materials analyzed**
     - GO-s Corrugated Graphene Oxide, GO-ms Folded Graphene Oxide, GO-mg Flower Corrugated Graphene Oxide, GO-s-NG Nitrogen Corrugated Graphene Oxide, GO-ms-NG Nitrogen Folded Graphene Oxide, Nitrogenous flower shaped corrugated graphene oxide GO-mg-NG
   - **Optimal operating frequencies**
     - 2 GHz
   - **Microscopy images**

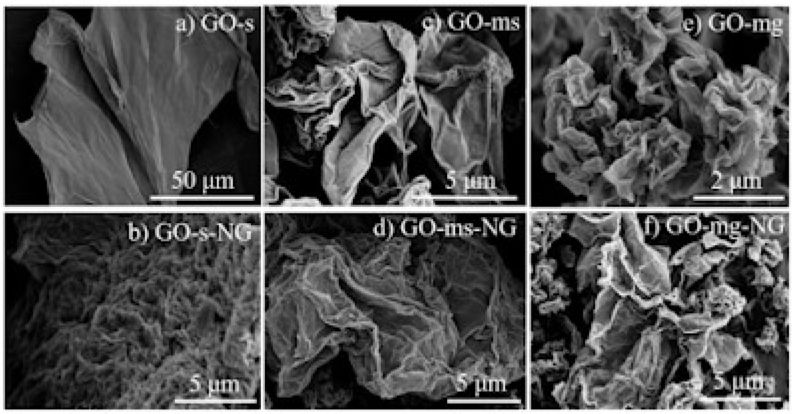

Fig. 10. Corrugation morphology of graphene oxide samples (Quan, L .; Qin, FX; Estevez, D .; Lu, W .; Wang, H .; Peng, HX 2019)

8. (Xu, Y .; Luo, J .; Yao, W .; Xu, J .; Li, T. 2015)
   - **Materials analyzed**
     - Graphene oxide flakes reduced with carbonyl iron powder and polyaniline rGO / F-CIP / PANI
   - **Optimal operating frequencies**
     - 2-18 GHz
   - **Microscopy images**

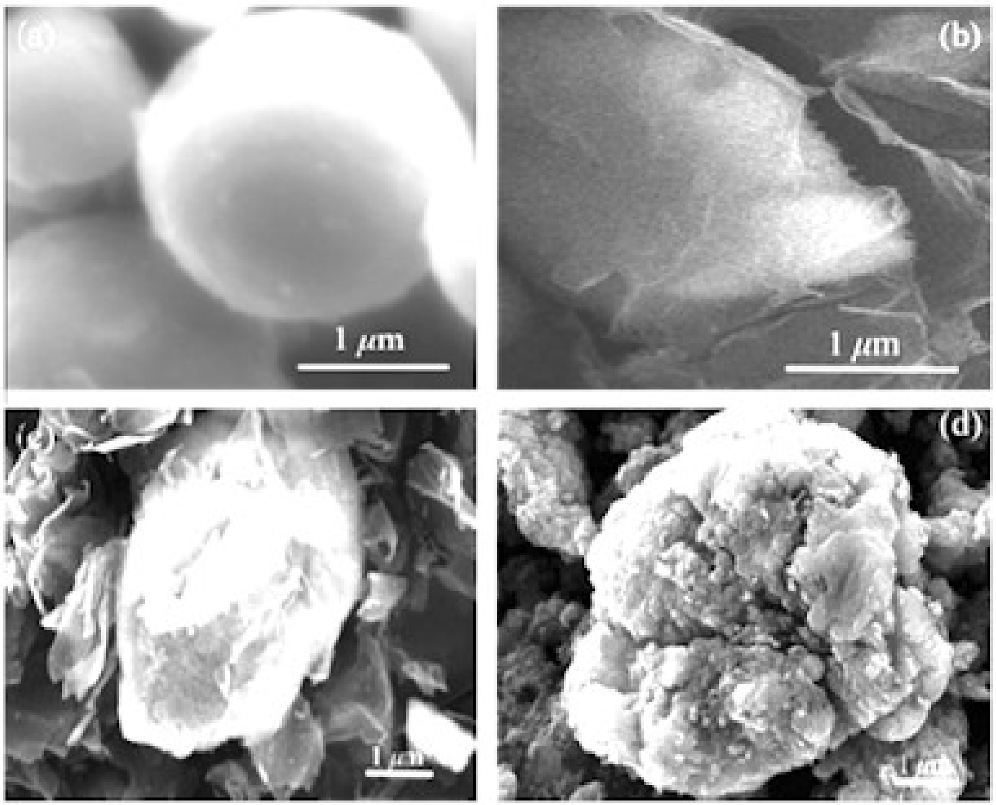

Fig. 11. Table C) F-CIP coated graphene oxide compound (Xu, Y .; Luo, J .; Yao, W .; Xu, J .; Li, T. 2015)

9. (Zhang, L .; Yu, X .; Hu, H .; Li, Y .; Wu, M .; Wang, Z .; Chen, C. 2015)
   - **Materials analyzed**
     - Ferrous sulfate heptahydrate, iron sulfate heptahydrate (II) thermocombined with reduced graphene oxide $FeSO_4 \cdot 7H_2O$ / rGO
   - **Optimal operating frequencies**
     - 2-18 GHz
   - **Microscopy images**

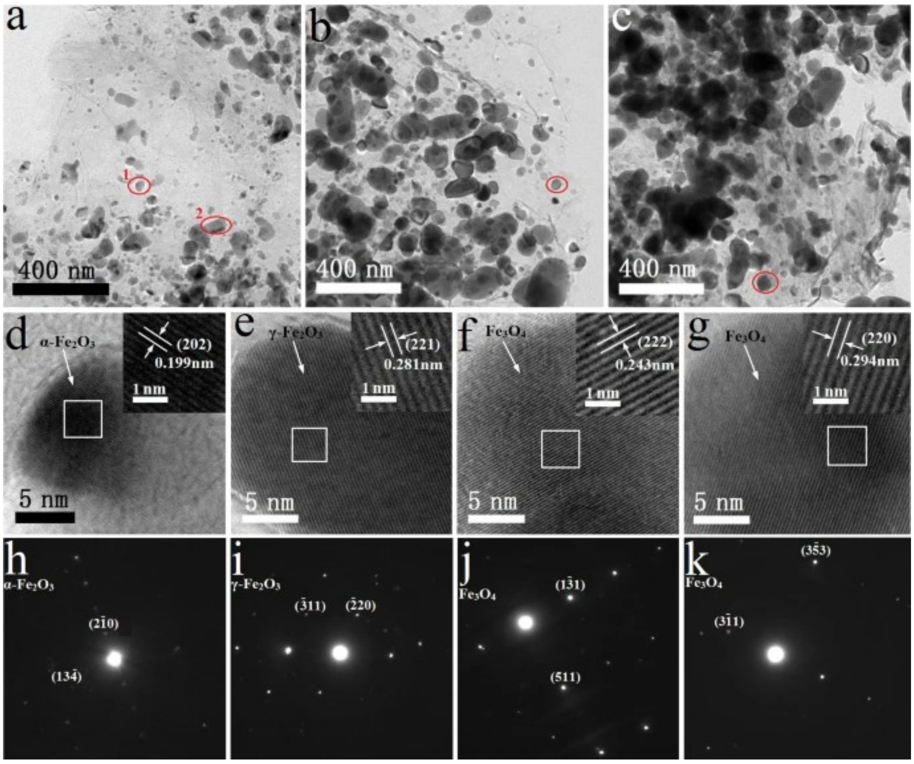

Fig. 12. Microscopy of FeSO4 · 7H2O / rGO (Zhang, L .; Yu, X .; Hu, H .; Li, Y .; Wu, M .; Wang, Z .; Chen, C. 2015)

10. (Sun, X .; Sheng, L .; Yang, J .; An, K .; Yu, L .; Zhao, X. 2017)
    - **Materials analyzed**
        - Reduced graphene oxide combined with zinc oxide and barium ferrite 3D-RGO-ZnO / BaFe 12 O 19
    - **Optimal operating frequencies**
        - 5.8-11.52 GHz
    - **Microscopy images**

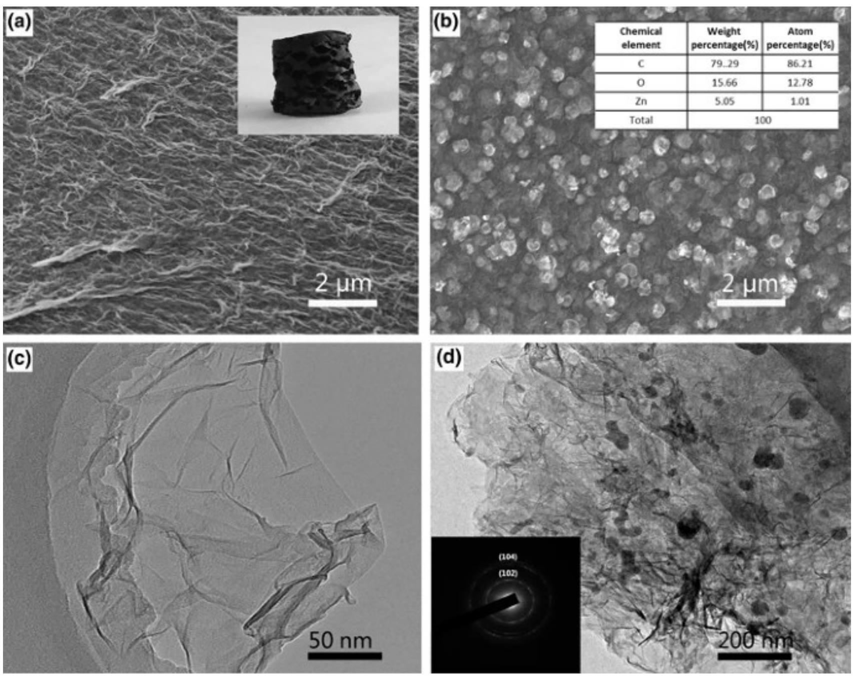

Fig. 13. 3D-rGO-ZnO sample (Sun, X .; Sheng, L .; Yang, J .; An, K .; Yu, L .; Zhao, X. 2017)

Feedback

1. The nanocomposites based on graphene oxide GO and reduced graphene oxide rGO are found to have the ability to absorb electromagnetic waves in almost all emission ranges. In the study by Ameer and Gul referred to in this post, they are described in a range from 1MHz to 3GHz, which means that absorption is not only limited to the 5G bands, it also includes 2G, 3G and 4G.
2. The rest of the referred studies show that GO graphene oxide has electromagnetic absorption properties by itself, regardless of the compound or nanomaterial with which it is configured for its enhancement or amplification. Therefore, it can be stated that graphene oxide inoculation can cause the absorption of electromagnetic waves that cause cellular decomposition due to oxidative stress and the release of free radicals, generating damage to the body and adverse effects , already explained in previous posts.. On the other hand, the interest of the scientific community for this research area is also demonstrated, since 884 results are found in Google Scholar with the expert search "reduced graphene oxide" "absorption" "bandwidth" "MHz" "GHz" .
3. According to the reports from the radio spectrum reports and especially from the 5G National Observatory, the 26GHz band is the key to the development of the fourth industrial revolution, this is the automation and integration of artificial intelligence in all services and industrial and productive activities. Interestingly, the 26GHz frequency is explicitly cited by (Chen, Y .; Fu, X .; Liu, L .; Zhang, Y .; Cao, L .; Yuan, D .; Liu, P. 2019) in his article on the electromagnetic absorption properties of 5G , making it suitable for remote neuromodulation, see (Li, X .; Xiong, H .; Rommelfanger, N .; Xu, X .; Youn, J .; Slesinger, PA; Qin, Z. 2021). This grants the virtual ability to neuromodulate to people inoculated with graphene oxide.

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