

Graphene materials as anti-bacteria/viral agent

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Abstract

The recent Covid-19 global health crisis has triggered intense R&D to find vaccines, detection methods and personal protection. Graphene based materials, and specifically graphene oxide (GO) have been identified as a promising candidate in biomedical applications due to their unique properties such as biocompatibility, hydrophilicity, high surface area, dispersity as well as antibacterial/antiviral properties [1,2]. The interaction mechanism between graphene oxide and various pathogens leads to inhibition of bacterial and viral growth. GO has high potential to help in the war on virus. Recently, graphene oxide nanocomposites have also been used for anti-bacterial coatings [3], sensors [4], and other biomedical applications [5]. Antibacterial and antiviral coating with graphene oxide nanocomposites have great potential in health care to control microbial and viral infection. The combination of nanoparticles such as silver, TiO_2 , Fe_3O_4 , Cu_2O and ZnO nanoparticles with GO can be considered for personal protection equipment to decrease the transmission of viruses increases effective, increases surface area, and prevent from the aggregation of graphene oxide nanosheets [6]. GO-nanocomposites can be used as face mask filter due to remarkable antibacterial/ antiviral properties for health protection. In this context it should be noted that Health Canada is advising not to use face masks that contain graphene because there is a potential that they could inhale graphene particles, which may pose health risks [7]. Therefore, it is important how these nano filters are produced by using graphene-based material. Examples of biomedical applications of GO-nanocomposites are schematically illustrated in Fig. 1.

References

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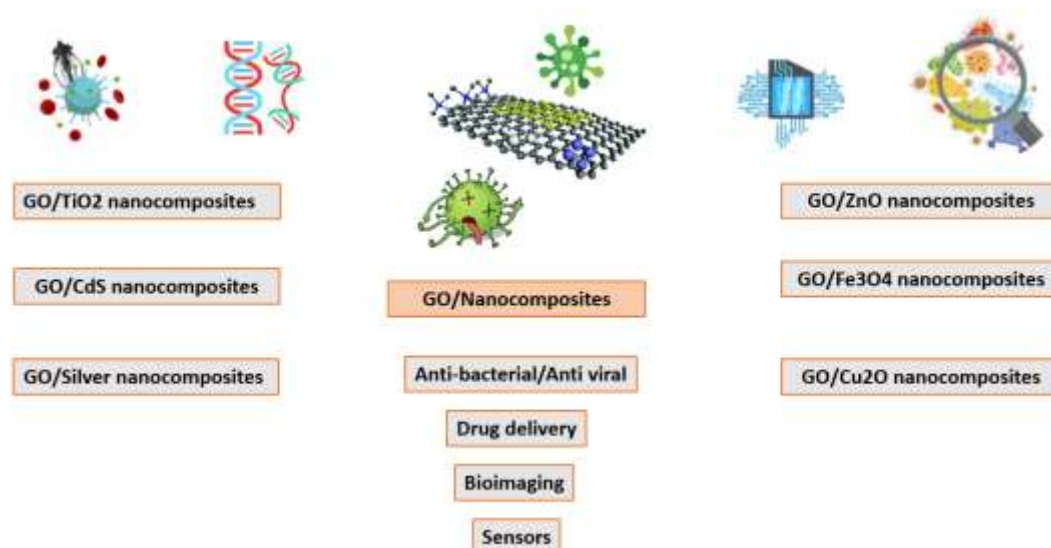


Figure 1: Schematic overview of graphene oxide nanocomposites for anti-bacterial /viral applications