Use of Graphene Associated With Nanoporous Inorganic Membrane for Water Treatment

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Among the worst domestic and industrial pollutants that affect water resources, we have oils, since one liter of this substance can contaminate up to twenty-five thousand liters of water. Also, when in contact with the body of water, the oil, in high concentrations, hinders the transfer of oxygen to these systems, affecting the survival of several species. However, the major problem found is that the presence of oil in the residue makes the treatment very expensive, especially when it is combined with low pH. Thus, the research aimed to develop an economically viable and effective method for the treatment of oily industrial effluents using graphene in different concentrations incorporated into a low-cost inorganic compound. The choice of graphene is due to its innovative proposal and its attractive properties, including a high degree of hydrophobicity and high impermeability. For this, cryptomelane is obtained in the laboratory through a reflux reaction and then operations are carried out to make it porous and hydrophobic. Considering that the material without graphene tends to crumble, the incorporation of graphene is tested in two methods: post-reflux (1) and pre-reflux (2), and the performance of the membrane is evaluated through the ability to absorb oil and developed morphology, therefore, the method 2 manages to absorb 70% more oil than the 1 and presents a better performance when in relation to the mechanical resistance, making the membrane a material with several possibilities of application in the industry and, still, environmentally friendly, meeting UN’s Sustainable Development Goals number 6.

Awards Won:
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