Carbon/zinc composite material synthesis using dopamine molecule as a chelating agent.

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Carbon materials can be used in different applications from electronics up to the biomedical field [1]. Among all of this class of materials, the chemically modified carbon present distinctive properties due to the oxygen group bonds in the carbon sheet. Aiming to produce new carbon-based nanocomposites, we induced the zinc chelation in chemically modified graphite using dopamine as a chelating agent in the surface of carbon material. The synthesis route used was through UV-radiation activation of dopamine molecules, promoting its adhesion on reduced graphene oxide with posterior zinc reduction ate the composite surface. The synthesized composite was characterized using X-ray diffraction, Fourier-transform infrared spectroscopy, and scanning electron microscopy. The obtained result demonstrated that was preserved initial carbon structure after composite synthesis, with the increase of zinc related phases in the final product. The Fourier-transform infrared spectroscopy showed the presence of oxygen and zinc bonds, indicating the effective chelation of zinc ions. The scanning electron microscopy showed no significant difference in the material after dopamine and zinc incorporation; otherwise, the electron energy dispersive X-ray spectroscopy changes in the material, with the presence of zinc in the composite material. The obtained results support obtaining a carbon-based composite with the incorporation of zinc phase at the material surface.

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References

[1] F. Alemi et al. Journal of Drug Delivery Science and Technology 60 (2020) 101974