Graphene enhanced PVA polymer composite films

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Graphene because of its outstanding mechanical, electrical, and thermal characteristics, graphene has received a lot of interest in recent years. One of the most potential graphene uses is the creation of graphene-enhanced polymer composites, which can have better characteristics than pure polymers. In this poster presentation, we will discuss the development and characterization of graphene-enhanced polyvinyl alcohol (PVA) films. PVA is a water-soluble polymer that has been widely used in various applications, including food packaging, biomedical applications, and water treatment. However, PVA films have limited mechanical, electrical, and thermal properties. The addition of graphene to PVA films can significantly improve their properties. The creation and characterisation of graphene-enhanced polyvinyl alcohol (PVA) films will be the focus of this poster presentation. Solution casting was used to create the PVA films, and varying quantities of graphene were added to the solution before casting. A universal tensile testing machine was used to assess the mechanical characteristics of the films, such as tensile strength and Young's modulus. The films' tensile strength and Young's modulus improve as graphene concentration increases. Additionally, the graphene enhanced PVA films are transparent and flexible, making them appropriate for a variety of applications. The inclusion of graphene into PVA films has the potential to result in the production of high-performance materials with enhanced mechanical, electrical, and thermal characteristic.

References

[1] Chen, L., Zhu, Y., Huang, L., Wang, S., Xie, H., & Chen, Y., Polymers, 10(7), (2018), p. 727.
[2] Wang, L., Fan, X., & Ma, C., Materials Letters, 164, (2016), p.484-487.
[3] Wu, J., Han, Y., Zhang, M., Li, L., Li, Y., & Jiang, G., Journal of Materials Science, 50(24), (2015), p.8084-8092.
[4] Yu, L., Cheng, Q., Li, Y., & Li, Y., Journal of Materials Science, 54(5), (2019), p.4337-4347.

Figures

Figure 1: Sample A & C mixture solution GO/PVA & rGO/PVA with different molecular weight PVA polymer and sample B & D fabrication of GO/PVA & rGO/PVA films.