

# **CHARACTERISATION AND PHYSICAL PROPERTIES OF POLYMER BLENDS AND COMPOSITES**

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## **EXECUTIVE SUMMARY**

Mixing of two or more different polymers or copolymers is known as blending. By blending of conducting and conventional polymers, the mechanical and electrical properties can be enhanced. The properties of natural polymers were significantly improved by blending with synthetic polymers. The objective of preparing a new blend of two or more polymers is not just to change the properties of component drastically, but also to capitalize on the maximum possible performance of blend. Processing conducting polymers in the form of blends with commercial polymers has opened a wide range of application and increased the technological potential of these materials. Hence synthesis of polymer composites and blends has vast opportunities and thus the interest in search for a new material. Although a great number of blends of polymers have been investigated, little has so far been done to characterize the materials produced, as well as to optimize the blends properties as a function of preparation conditions. The future of polymer blends and composites prepared by solvent casting technology and spin coating technology will be closely linked to the need of emerging new biomedical, pharmaceutical, industrial and electronic applications with outstanding properties.

This research work on “Characterization and Physical properties of some polymer blends and composites” aimed to synthesize and characterize natural polymer- synthetic polymer blends of chitosan and polystyrene produced using a solvent mixture under conditions for which improved performance is achieved. The synthesis was achieved by both solvent casting and spin coating technique. The obtained polymer blend was appropriately characterized using FTIR, XRD, SEM and TGA.

It was found out that the prepared blends of CS-PS are thermally stable and have good mechanical stability. From the SEM images it is concluded that the films have uniform surface morphology. The property of amorphous nature of the films observed from the XRD analysis,

finds application in heavy metal adsorption. The Spectral studies showed the presence of peaks and absorption bands indicating the formation of the complex.

**Outcome of the Project:** As per the main objective of this project we have learnt the conventional method of synthesizing new polymer blend of Chitosan and polystyrene has been achieved using spin coating and solvent casting technique. The synthesized polymer blend can be used as an adsorbent for effluent water treatment and as a novel material. These research findings were compiled into a research paper , presented at the sixth DAE symposium held at Amity University, Noida during December 21-25, 2015 and was also published in the AIP conference proceedings.

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