Enhanced dielectric properties of poly(vinylidene fluoride) based sandwich structured composite films for energy storage applications

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**Abstract**. Pristine Poly (vinylidene fluoride) (PVDF) and PVDF/BZT-BCT (10%) composite films were synthesized by solution casting and were subsequently hot pressed. These films were assembled to form two sandwich-like structures, where Graphene Oxide (GO) is stuffed between two PVDF polymer films in one and PVDF/BZT-BCT (10%) films in the other. X-ray diffraction (XRD) and FTIR were done to confirm the structure and estimate the fraction of β-phase of PVDF and PVDF/BZT-BCT (10%). The fraction β-phase was found to be more than 69% in all the synthesized films. The microstructural analysis was done from both the surface as well as the cross-section of sandwich-structured films with the help of a scanning electron microscope (SEM). The dielectric study confirmed that after adding GO to both PVDF and PVDF/BZT-BCT films, the dielectric permittivity of the stacked films is comparatively higher than that of the pure polymer film as well as the composite films, taken individually. The as-prepared sandwich-structured composite films show comparatively higher permittivity than that of the pure PVDF (10.4 at 1 kHz at room temperature) and PVDF/BZT-BCT (10%) (11.2 at 1 kHz at room temperature), considered alone. This contribution comes up with an efficient method to prepare polymer-based dielectric composite films for energy storage and harvesting applications.

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