Synthesis and characterization of electroactive β-PVDF with $BaTiO_3$ nanocomposites

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Abstract: This paper aims poly(vinyledene) PVDF-$BaTiO_3$nanocomposite as a function of ceramic filler size and content. In this paper synthesis of semicrystalline β phase PVDF and PVDF-$BaTiO_3$ (BTO) composites by solvent casting method and their characteristic investigation have been reported. The crystalline phase was confirmed from XRD analysis, compositional bonding was studied from FTIR analysis and surface morphology investigation was done using SEM. Charge generation capability of the PVDF-BTO composites was analyzed from polarization-hysteresis curve. It was observed that the dielectric constants of the nanocomposites increased by adding 30 wt % of BTO particles, while the dielectric loss of the nanocomposite decreased. Maximum energy density of PVDF-BTO composite film was found to be 0.242 J/Cm^3. These results demonstrate an effective way to improve the performance of nanocomposites for capacitor, energy harvester applications

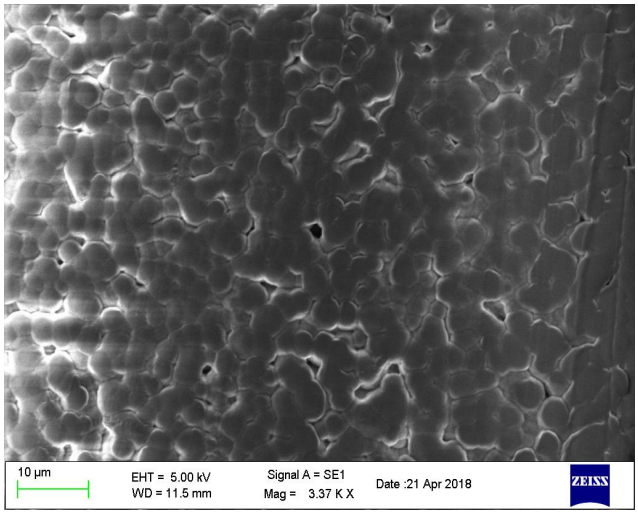

Figure 1: SEM micrograph of PVDF film.

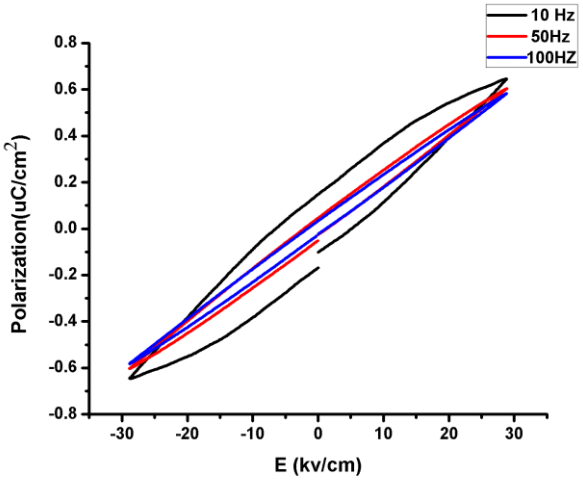

Figure 2: PE loop of PVDF film.

References:

[1] Tao Zhou, Jun-Wei Zha, Rui-Yao Cui, Ben-Hui Fan, Jin-Kai Yuan, and Zhi-Min Dang, ACS Appl. Mater. Interfaces, 3 (2011) 2184–2188.

[2] Hang Luo, Dou Zhang, Chao Jiang, Xi Yuan, Chao Chen, and Kechao Zhou, ACS Appl. Mater. Interfaces. 15 (2015) 1-39.

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