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Largely Enhanced Dielectric and Thermal conductive Properties of Novel Ternary Composites with Small Amount of Nanofillers

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Abstract

Polymer-based composites with excellent dielectric and thermal conductive properties attract ever-increasing attentions from researchers due to the irreplaceable role in energy storage system and electrical devices. Herein, poly(vinylidene fluoride) (PVDF)-based ternary composites were fabricated by adding small amount of poly(dopamine) coated boron nitride (DBN) and electrochemical exfoliated graphene (EEG) into PVDF matrix. Due to the high degree of π -conjugation and good dispersity of EEG, high dielectric constant could be achieved with a very small addition. Meanwhile, after a small amount of DBN was introduced into the EEG/PVDF system, high dielectric constant, low dielectric loss and excellent thermal conductivity were integrated into the EEG/DBN/PVDF ternary composites due to the synergistic effect of DBN and EEG. Compared with the dielectric constant of 591 and

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