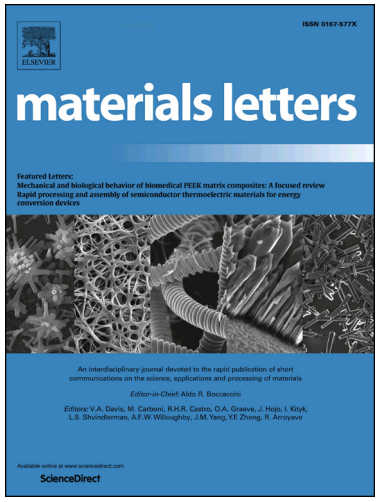

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Low-temperature synthesis of polyimide / poly(vinylidene fluoride) composites with excellent dielectric property

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Abstract

All-organic polyimide (PI)/poly(vinylidene fluoride) (PVDF) composite materials with high dielectric constant and low dielectric loss were fabricated via solution blending followed by the chemical imidization of polyamic acid (PAA, precursor of PI) at a low temperature. The dielectric and thermal properties of the PI/PVDF composites were investigated. Results indicated that the dielectric properties of the composites were significantly increased due to the incorporation of PVDF, and the composites exhibited excellent thermal stability. The dielectric constant of the composites was sharply increased to 7.745 at 1 kHz, which was approximately 2.1 times higher than that of pure PI. The dielectric loss was only 0.0898 when PVDF content was as high as 50 wt.%. Moreover, the dependence of the dielectric constant and dielectric loss on frequency was studied. Within the testing frequency range of 100 Hz to 1 MHz, the dielectric constant of the composites slightly decreased and the dielectric loss was less than 0.12. The results demonstrated that the PI/PVDF composites were promising dielectric materials for modern electronic applications.

Keywords: polyimide; polymeric composites; dielectrics; organic