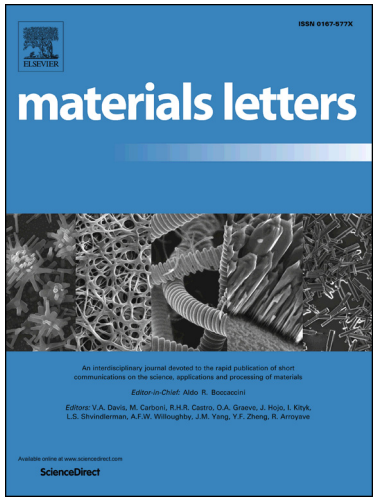

Soft piezoelectric polymer of poly[di(ethylene glycol) adipate] plasticized poly vinyl chloride and its strain sensing

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Soft piezoelectric polymer of poly[di(ethylene glycol) adipate] plasticized poly vinyl chloride and its strain sensing

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ABSTRACT

This letter reports that a plasticized poly vinyl chloride (PVC) exhibits high dielectric constant with low Young's modulus which drastically improves its piezoelectric property and strain sensing behavior. PVC was plasticized by poly[di(ethylene glycol) adipate] (PDEGA) and PDEGA-PVC was fabricated by simple solvent mixing process. As increasing the PDEGA content, the dielectric constant of PDEGA-PVC increases meanwhile its Young's modulus and yield strength decrease, which results in great improvement of the piezoelectric charge constant of PDEGA-PVC (51.2 pC/N), much higher than the pristine PVC (0.34 pC/N). A strain sensor with PDEGA-PVC was tested and its durable strain sensing behavior is demonstrated. The developed PDEGA-PVC is applicable for sensors of wearable and portable devices and soft actuators.

Keywords: Piezoelectric polymers, Poly vinyl chloride, Plasticizer, Strain sensor.