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Polymer Based Piezoelectric Energy Harvesters

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Editorial

Editorial Corner: A Personnel View

Cost effective harvesting of energy associated with ambient vibrations offers a clean and competitive technology to the renewable energy market so as swap conventional batteries that often suffer from tribulations associated with replacing/recharging. This has led the scientific community to compute various designs with varied piezoelectric systems to affect maximum energy harvesting, however the best design for a vibrational energy harvester is totally dependent on the quantity of power harvested with the smallest available area at optimum frequency of ambient vibration source. Inorganic materials are most sought piezoelectric harvesters; however polymeric materials with high mechanical flexibilities and reversible strechabilities offer an upper hand over the conventional ceramic materials, with superior mechanical properties affecting fatigue resistance alongside enhancement of device lifetime. In addition, the ability of polymeric systems to display dopant dependent opto-electronic properties have led to the design and development of various polymer composites based piezoelectric systems. Nevertheless, in recent years the fabrication of mechanically stable large area and high power output nanocomposites on flexible plastic substrates is gaining increasing technological significance with several research groups fabricating lead-free piezoelectric harvesters using titanates and niobates. Further, the nanocomposite based piezoelectric generators are expected to improvise by further espousing nanotechnology enabled controlled synthesis of lead free piezoelectric ceramic systems with desired morphologies in addition to employing nanostructured metal reinforced conducting polymers alongside novel printing techniques may open up the technological gateway towards the development of environmentally benign self-powered energy systems.