



Contribution ID: 40

Type: Oral

Development of polymer based flexible Piezoelectric nanogenerators for tactile sensing application

In today's IOT based world, tactile sensors play a vital role in providing information arising from physical interaction with surrounding environment. Amongst various types of tactile sensors, piezoelectric nanogenerator based sensors are quite effective owing to their efficient performance under any small external stimuli. Especially polymer based flexible piezoelectric nanogenerators are useful for integration to human body and thus have gained a significant attention. In this work we present the development of PVDF-HFP based flexible nanogenerator for tactile sensing application. The PVDF-HFP polymer has been developed using simple chemical technique and the flexible sensor devices have been achieved upon integrating Aluminum substrates over the polymer films. The fabricated devices were responsive towards biomechanical impacts like finger tapping, hand clapping etc. and showed a maximum open circuit voltage 43.64V and 0.15 μ A of short circuit current. Further upon attachment of such five sensors to a common nitrile gloves, distinguishable signals were recorded upon holding surrounding objects. Finally, the signals generated out of such gloves were successfully transferred to a mobile device of an end user via Bluetooth module. Further optimization of such nanogenerator can lead to the fabrication of prototype wearable components for efficient tactile sensing and transmission to a remote location.

Keywords: Polymer, nanogenerator, piezoelectric, sensing

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Session Classification: Technical Session 03

Track Classification: Track 02