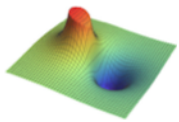

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STEP-V#10

Self-assembled electret utilizing spontaneous orientation polarization for vibrational energy generator

Yuya Tanaka

Graduate School of Science and Technology, Gunma University, Japan.

E-mail: yuya.tanaka@gunma-u.ac.jp

Electret-based vibrational energy generators (E-VEGs) have attracted considerable attention because they can generate relatively high output power even in several tens of Hz. Further, they can be miniaturized by using microelectromechanical systems (MEMS) technology. However, the practical realization of E-VEGs is still limited because of the complex fabrication process, mainly due to the charging process for dielectric materials. To solve this problem regarding electret preparation, our group recently proposed using polar organic molecules, which were initially developed for organic light-emitting diodes (OLEDs), as an electret [1]. The surface potential of the film composed of these molecules is built up without any charging process, owing to the spontaneous orientation polarization of the dipoles [2]. By using these molecules, we developed E-VEGs without the requirement of any charging process, suggesting that polar organic molecules can be regarded as "self-assembled electret (SAE)" [3,4]. We believe that applying the SAE to E-VEGs opens up a new pathway for device development. This presentation will discuss the SAE, SAE-based VEG, and its operation mechanism.

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