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Ferrofluid based micro-electrical energy harvesting VISWAS PUROHIT, Symbiosis Institute of Technology, Near Lupin Research Park, Lavale, Mulshi, Pune-412115, MAH, India, BAISHAKHI MAZUMDER, Materials Department, University of California, Santa Barbara, CA93106, GRISHMA JENA, MADHUSHA MISHRA, Symbiosis Institute of Technology, Near Lupin Research Park, Lavale, Mulshi, Pune-412115, MAH, India, MATERIALS DEPARTMENT, UNIVERSITY OF CALIFORNIA, SANTA BARBARA, CA93106 COLLABORATION — Innovations in energy harvesting have seen a quantum leap in the last decade. With the introduction of low energy devices in the market, micro energy harvesting units are being explored with much vigor. One of the recent areas of micro energy scavenging is the exploitation of existing vibrational energy and the use of various mechanical motions for the same, useful for low power consumption devices. Ferrofluids are liquids containing magnetic materials having nano-scale permanent magnetic dipoles. The present work explores the possibility of the use of this property for generation of electricity. Since the power generation is through a liquid material, it can take any shape as well as response to small acceleration levels. In this work, an electromagnet-based micropower generator is proposed to utilize the sloshing of the ferrofluid within a controlled chamber which moves to different low frequencies. As compared to permanent magnet units researched previously, ferrofluids can be placed in the smallest of containers of different shapes, thereby giving an output in response to the slightest change in motion. Mechanical motion from 1-20 Hz was able to give an output voltage in mV's. In this paper, the efficiency and feasibility of such a system is demonstrated.

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