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Performance analysis of zinc oxide piezoelectric MEMS energy harvester

(Conference Paper)

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Abstract

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This paper presents the design and analysis of MEMS piezoelectric energy harvester. Zinc oxide (ZnO) MEMS piezoelectric energy harvester has been utilized as piezoelectrically active cantilever for mechanical to electrical transduction. A COMSOL Multiphysics model was used which provide accurate information on the frequency, stress and voltage output of a ZnO piezoelectric energy harvester. Few design parameters have been studied which are rectangular cantilever, triangular cantilever, rectangular cantilever with proof mass and using different types of piezoelectric materials. The effects of varying geometrical dimensions of the device were also investigated. From simulation results, it was found out that ZnO piezoelectric energy harvester with the length of 150 μm, width 50 μm and thickness of 4 μm generates 9.9184 V electric potential under the resonance frequency of 0.71 MHz and 1 $\mu N/m^2$ mechanical force applied. © 2014 IEEE.

Author keywords

COMSOL Multi Physics MEMS piezoelectric energy harvester ZnO

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