

Design, Analysis and Finite Element Modeling of Macro Fiber Composite Piezoelectric Materials [†]

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Abstract: Vibration energy harvester has been paid a lot of attention by many researchers to transforming ambient vibration into electrical energy, which is normally utilized to develop wireless electronic sectors. The paper presents a finite element model (FEM) of a vibration energy harvester consisting of a bimorph electromechanical system (MEMS) generator. The model is used to simulate, and compare, the mechanical characteristics and electrical response of piezoelectric material results between the cantilever beam structure formed by laminating two piezoelectric layers on both sides of a Carbon fiber reinforced polymer (CFRP) substrate and Ti-6Al-4V substrate using ANSYS®19 R1. A set of numerical simulations has been carried out, and the results show that the comparisons of the harmonic response analysis seen change between the different substrates based on the bimorph piezoelectric MEMS generator.

Keywords: FEM; MEMS; CFRP; ANSYS; cantilever beam.

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Conflicts of Interest

The authors declare no conflict of interest.