Harvesting ansys,andcoventorware [7]. acoustic energy isclean, ubiquitous, andsus…

Harvesting mechanical vibration energy via piezoelectric materials has been widely studied numericallyusingCOMSOL multiphysics. Kamel et al. 1 used beam bending theory to predict thegenerated electric powerfromvibrational piezoelectric harvesting devices (PHD). Renaud et al.

2 proposed design and characterization of a prototype of a piezoelectric bendingharvester to scavenge energy frommotion of human limbs. Majidi et al. 3 applied an array of vertically aligned zinc oxide (ZnO) nanoribbons to harvestnanoscale vibrationalenergy.

Wang et al. 4 used a curved beam in the cavity of a sonic crystal to harvest acoustic energy. Zurkinden et al. 5 investigated theharvesting mechanism of ocean surface wave energy using PVDF films. Kuehne et al. 6 studied apiezoelectric harvesting microgenerator for a tire pressure monitoring wireless sensor node.

The performance of piezoelectric micro-powergenerators has been calculatednumericallyusing COMSOL, ANSYS, andCoventorWare 7. Acoustic energy isclean, ubiquitous, andsustainable in our life, so it is a good candidate for an alternative energy resource. There are a fewsimulation and experimental studies todevelop acoustic energy harvesting mechanisms usingpiezoelectric transducers in the recentyears 4, 8-10. However, most previous studies have focused on harvesting at relatively high frequencies (a few kHz or MHz), which is rarely available in everyday life. In this study, we have performed numericalsimulations of an acoustic energy harvester which consists of a quarter-wavelength straight- tube resonator and piezoelectric cantilever plates placed insidethe tube using COMSOLMultiphysics 4.

3. The length of tube is designed to have a low operating frequency of ~200 Hz. Inside the tube resonator, single and multiple lead zirconate titanate (PZT) piezoelectric plates are placed to convert acoustic resonant energy to electricity. The simulation results are compared with the experimental data.

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