Screen printed PZT/PZT thick film bimorph MEMS cantilever device for vibration energy harvesting - DTU Orbit (29/12/2018)

We present a microelectromechanical system (MEMS) based PZT/PZT thick film bimorph vibration energy harvester with an integrated silicon proof mass. Most piezoelectric energy harvesting devices use a cantilever beam of a non-piezoelectric material as support beneath or in-between the piezoelectric materials; it provides mechanical support but it also reduces the power output. In our device we replace the support material with another layer of the piezoelectric material. With the absence of an inactive mechanical support all stresses induced by vibrations will be harvested by the active piezoelectric elements. We show experimental results from two types PZT/PZT harvesting devices, one where the Pb(ZrxTi1-x)O3 (PZT) thick films are high pressure treated during the fabrication and the other where the treatment is omitted. We find that with the high pressure treatment prior to PZT sintering, the films become denser and the harvester efficiency increases significantly.

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