

Fabrication and Characterization of d_{33} Mode (1-x)Pb(Mg_{1/3}Nb_{2/3})O_{3-x}PbTiO₃ (PMN-PT) Energy Harvester

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In this manuscript, a d_{33} mode piezoelectric micro-electromechanical systems (MEMS) energy harvester integrated with silicon proof mass, which is made of composite cantilever beams from a silicon layer and a single crystal PMN-PT thick film, is proposed. The silicon mass is fabricated by the deep-reactive ion etching (DRIE) process to reduce the resonant frequency for a matching ambient source. A PMN-PT film of 15 μm thickness is realized by the hybrid process of wafer bonding and grinding. The experimental results show that this fabricated prototype can generate a maximum output voltage of 1.18 V_{p-p} and corresponding power of 0.139 μW at the resonant frequency of 200 Hz and vibration acceleration of 2 g.

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