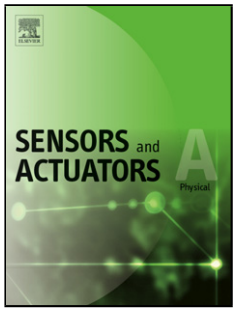

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Effect of Piezoelectric Layer Thickness and Poling Conditions on the Performance of Cantilever Piezoelectric Energy Harvesters on Ni Foils

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Highlights

- High figure of merit piezoelectric films are successfully deposited onto flexible metal substrate.
- MEMS piezoelectric energy harvesters integrated with the PZT film on flexible metal foil fully release the functionality of material itself without chemical damage to the film.
- Enhanced power density of the harvester (1036 μW/cm^2·G^2) was achieved using 3 μm thick sputtered PZT film on Ni
- The devices have low resonant frequency around 68 Hz that matches the ambient vibration sources from commercial devices.

Abstract

Lead zirconate titanate (PZT) films grown on flexible Ni foils were utilized to explore the effects of thickness and poling conditions on the performance of mechanical energy harvesters. In the case of Mn doped 1 μm thick (001) oriented sol-gel PZT (52/48) films on Ni foil, the dielectric constant and $|e_{31,f}|$ are 390 at 10 kHz and 11.3 C/m^2, respectively, after hot poling.