5th International Electronic Conference on Sensors and Applications
ECSA-5
15 – 30 November 2018

Harvester of energy on PZT thin films

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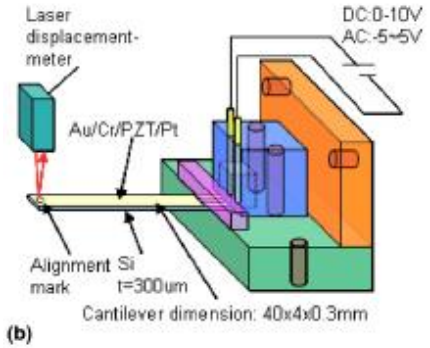
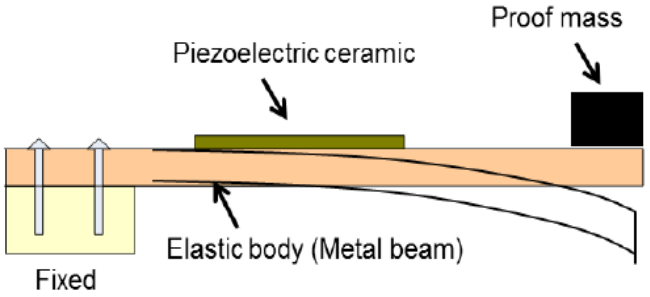
The experience of other researchers on the use of PZT thin films



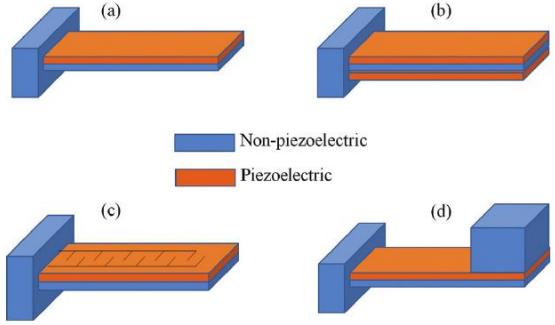
Schematic drawing of set-up for measuring the cantilever tip displacement of the energy harvester

(Xiong S., Kawada H., Yamanaka H., Matsushima T. Piezoelectric properties of PZT films prepared by the sol–gel method and their application in MEMS// Thin Solid Films 516 (2008) 5309–5312)



Schematic of cantilever type piezoelectric energy harvester

(Kang M-G., Jung W.-S., Kang Ch.-Y., Yoon S.-J. Recent Progress on PZT Based Piezoelectric Energy Harvesting Technologies//Actuators 2016, 5, 5)



Various configurations of piezoelectric cantilevers: (a) unimorph; (b) bimorph; (c) a piezoelectric cantilever with interdigitated electrodes; (d) a piezoelectric cantilever with proof mass at its free end

(Li H., Tian Ch., Deng Z.D. Energy harvesting from low frequency applications using piezoelectric materials //APPLIED PHYSICS REVIEWS 1, 041301 (2014))

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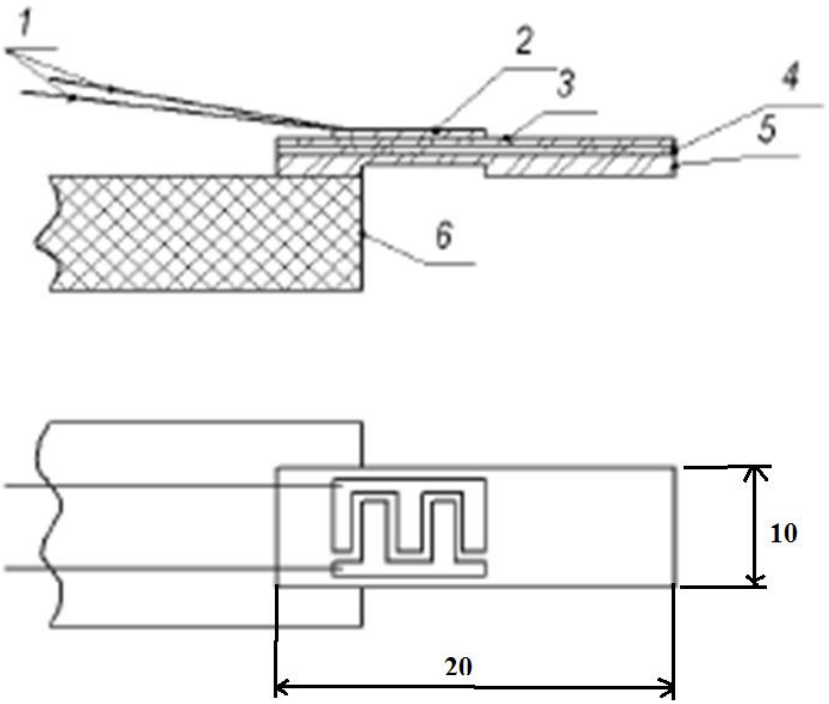

Schematic of a laboratory sample of energy harvester:

1 - wires;
2 - contact pads;
3 - PZT film;
4 - silicon oxide;
5 - silicon

Appearance of the laboratory sample of energy harvester:

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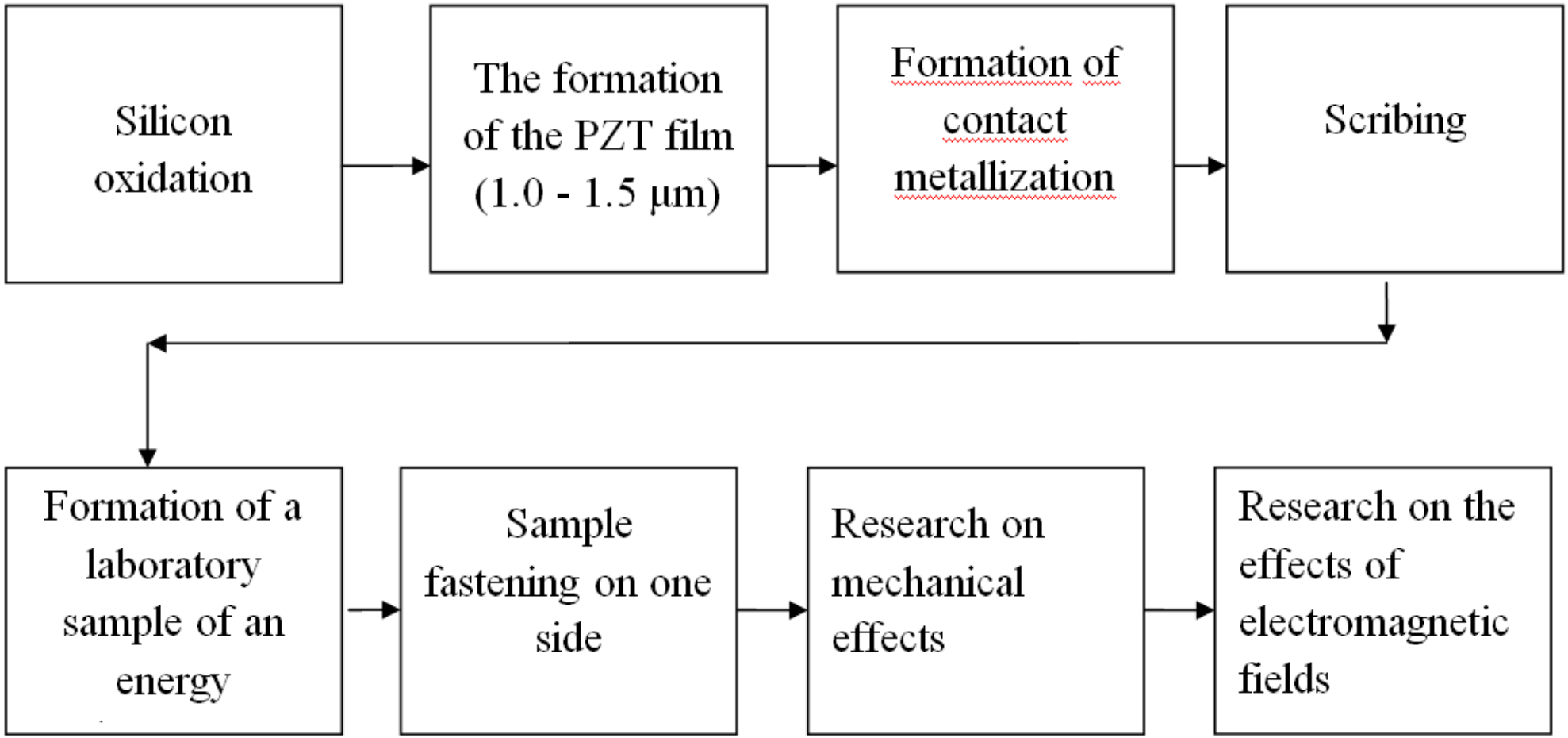

Technological scheme and research scheme of energy harvester properties

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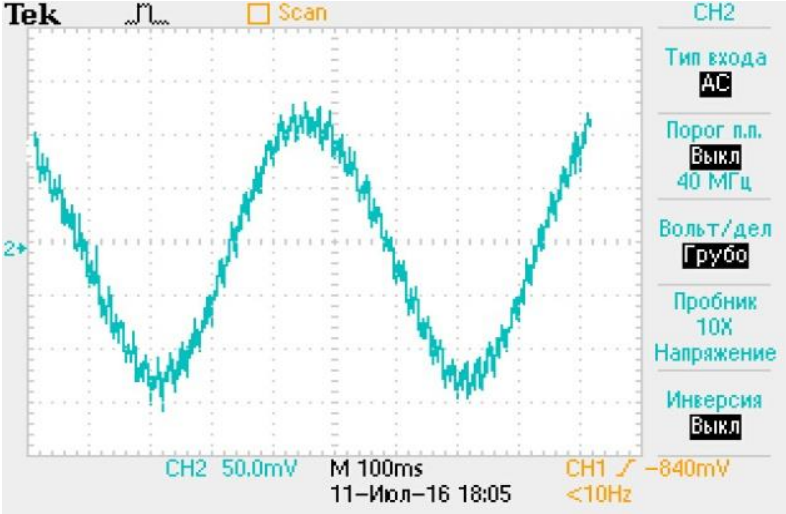
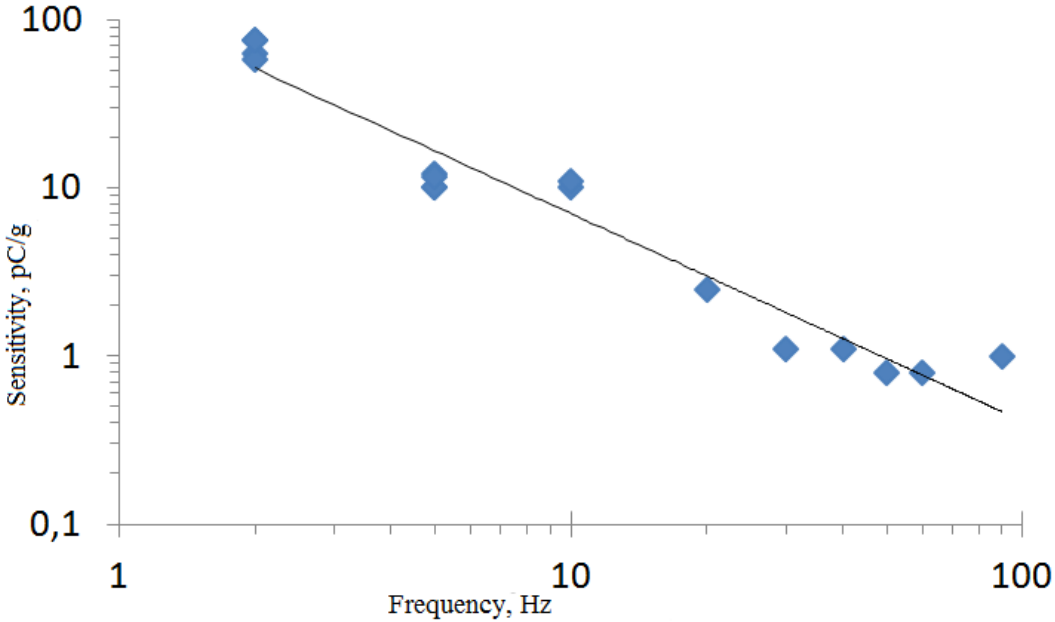


Test sample response at the frequency of 2Hz and acceleration of 0.2g



The dependence of the energy harvester sensitivity on the oscillation frequency (sensitivity of 75 pC/g)

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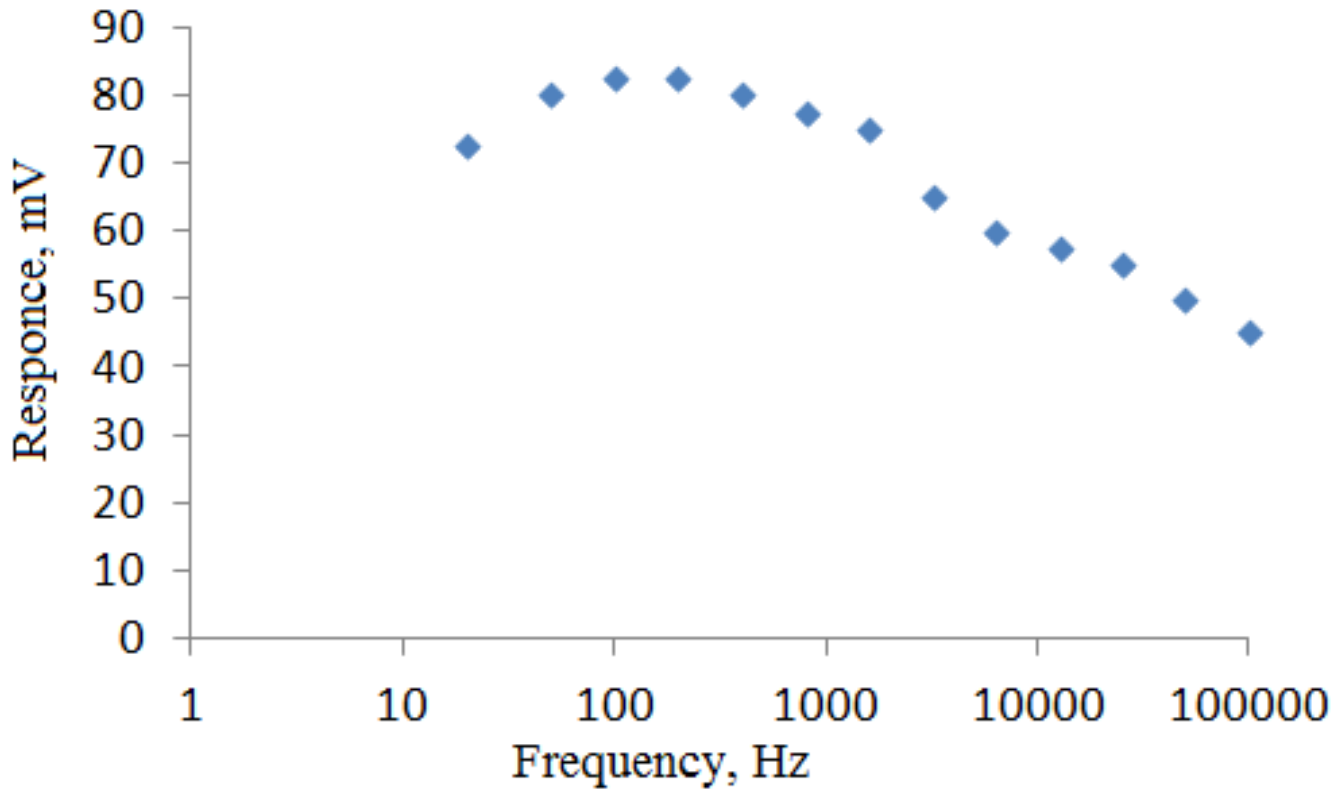

The dependence of the energy harvester response on the oscillation frequency

Measurements in the range of 1-100 V/cm showed that the sensitivity to field strength was $6.8 \cdot 10^{-4}$ V/(V/cm).

Thank you for your attention