

Vibration-driven Electret Energy Harvester

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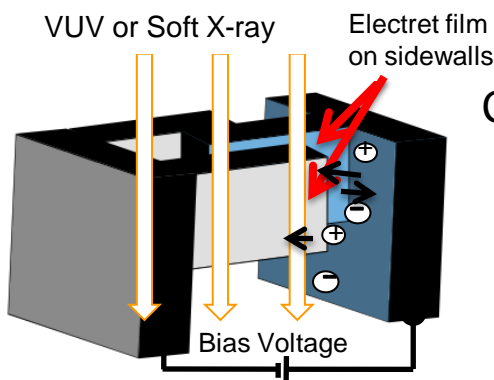
Keywords: Energy Harvesting, Vibration, Electret, Vacuum UV

Introduction

New electret charging methods using soft X-ray and vacuum UV enable vertical electrets.

→ Vibration-driven electret energy harvester using comb-drives

Vertical Electrets

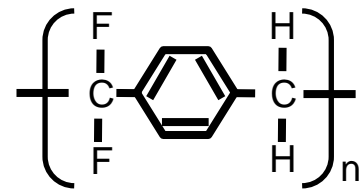


Electret:

CVD of 1 μm -thick diX-F (KISCO)

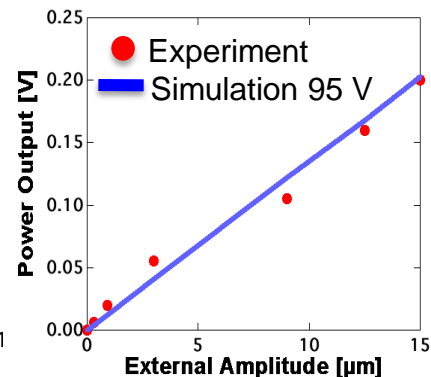
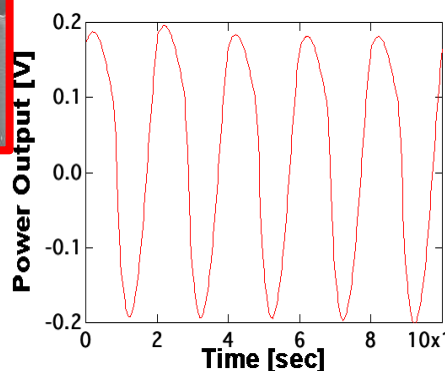
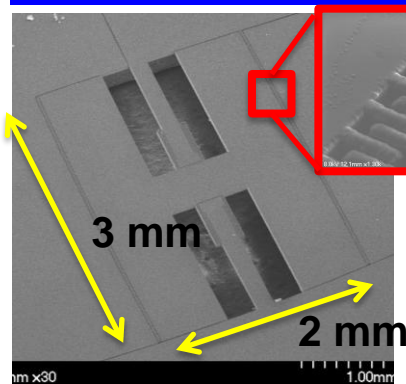
Charging condition:

9.5 keV Soft X-ray, bias voltage 150 V, 45 min.



MEMS Generator Prototype

$f_0 = 6.1 \text{ kHz}$, $Q = 10.2$



Summary

2 nW at 500 Hz and 15 G → 1.3 μW at 400 Hz and 1.5 G

- Up to 95 V obtained on diX-F vertical electrets
- Power output of 2 nW demonstrated at 500 Hz and 15G

Reference

[1] K. Yamashita *et al.*, Proc. PowerMEMS 2010, Leuven, (2010), pp. 165-168.