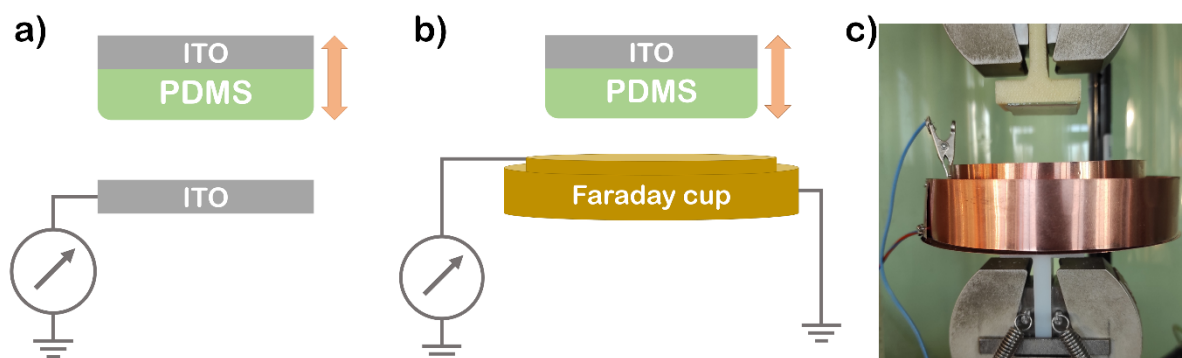


## Surface engineering of PDMS for improved triboelectrification

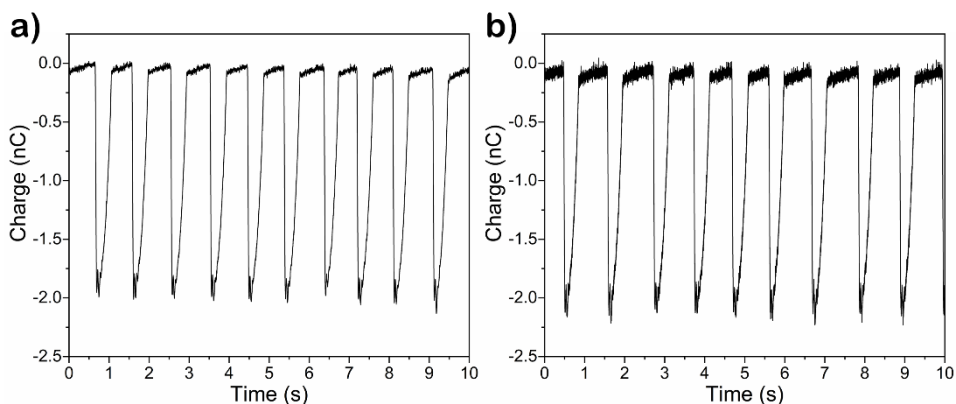
Līva Ģērmane,<sup>a</sup> Linards Lapčinskis,<sup>a,b\*</sup> Mairis Iesalnieks,<sup>b</sup> Andris Šutka<sup>b</sup>

<sup>a</sup> Institute of Technical Physics, Faculty of Materials Science and Applied Chemistry, Riga Technical University, P. Valdena Street 3, LV1048 Riga, Latvia.

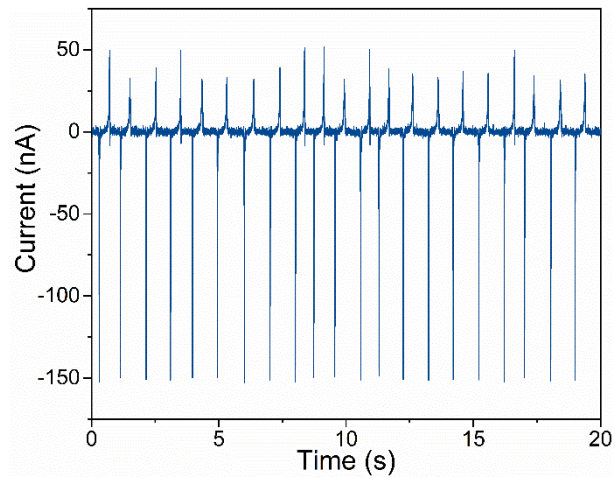
<sup>b</sup> Institute of Materials and Surface Engineering, Faculty of Materials Science and Applied Chemistry, Riga Technical University, P. Valdena Street 3, LV1048 Riga, Latvia.



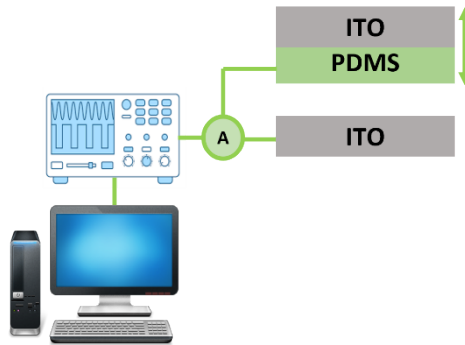
**Figure S1.** Schematics of a) improved and b) classical Faraday cup measurement setup; c) photo of the custom-made Faraday cup.



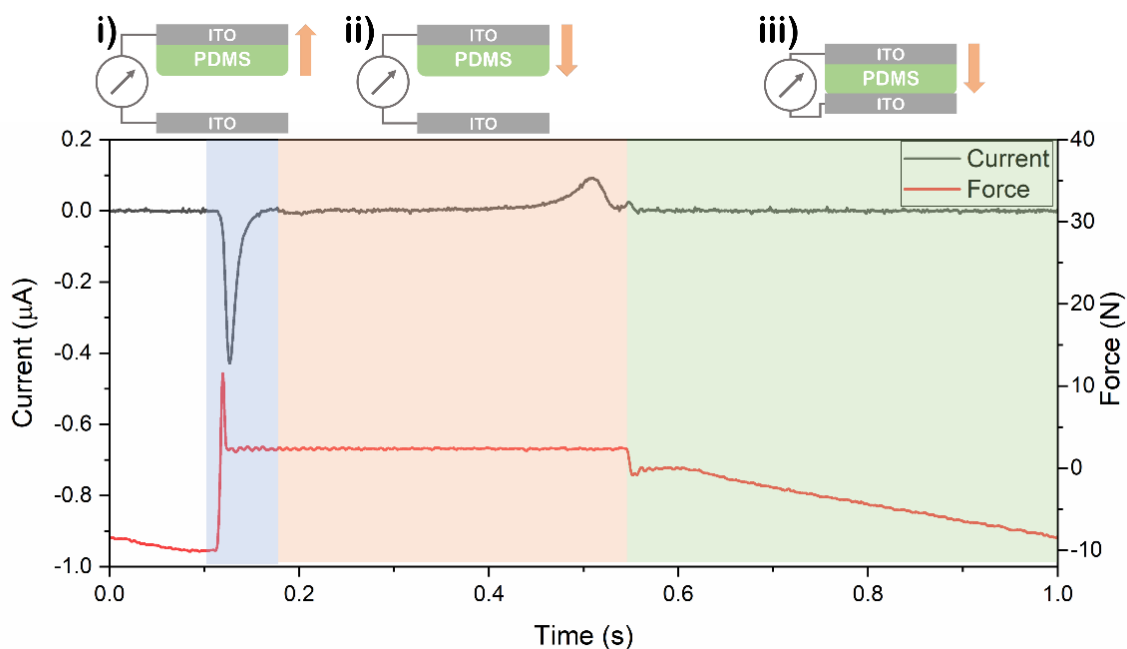
**Figure S2.** Charge measurement with a) Faraday cup measurement setup used in this paper and b) classical Faraday cup measurement setup.



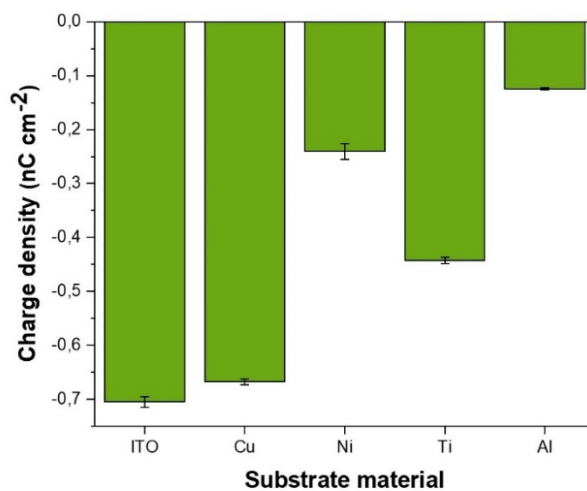
**Figure S3.** Current measurement of PDMS sample in a Faraday cup mode to compare with charge measurements shown in Figure S2. The charge density calculated from current peaks was  $0.419 \text{ nC cm}^{-2}$ .



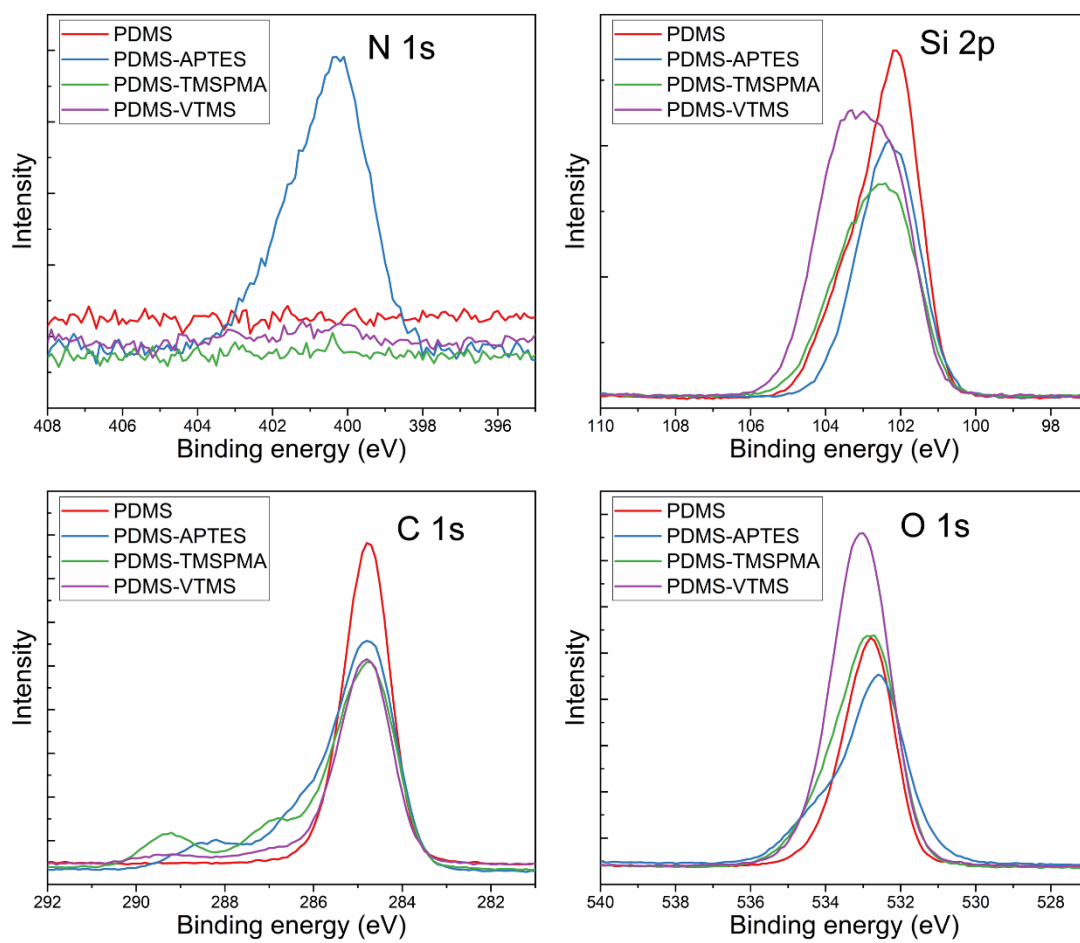
**Figure S4.** Schematic of TENG device measurements.



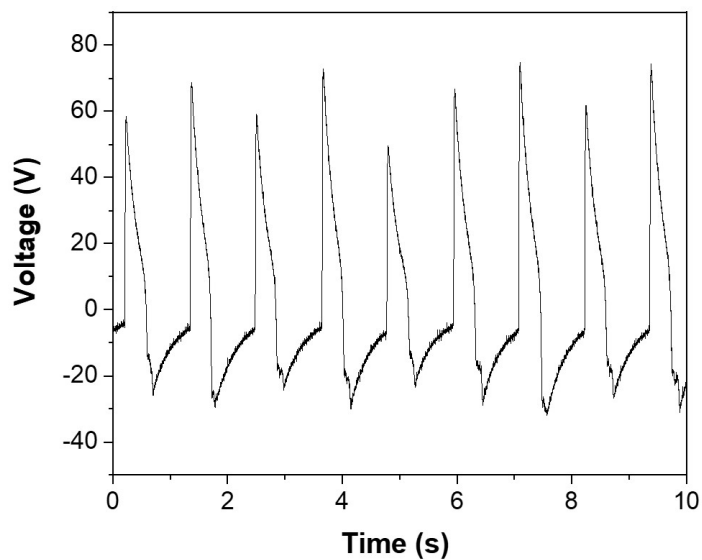
**Figure S5.** Schematic of contact-separation test stages: i) rapid separation of contacted surfaces (highlighted in blue) results in long and narrow current peak; ii) separated surfaces are brought together (highlighted in red) and wide current peak is observed right before contact; iii) both surfaces are compressed with 10 N force to ensure full contact between them (highlighted in green).



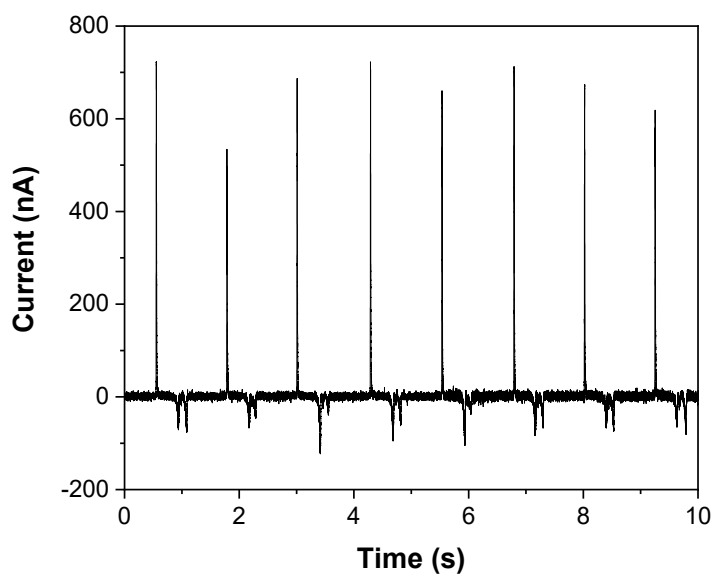
**Figure S6.** Charge density of PDMS layers with different electrode materials.



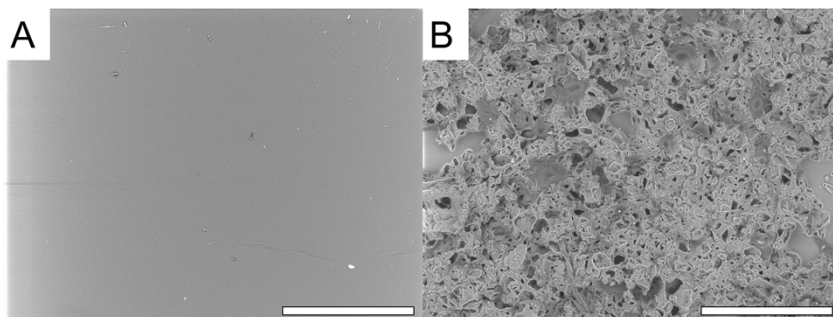
**Figure S7.** XPS spectra of PDMS films modified with various SAMs.



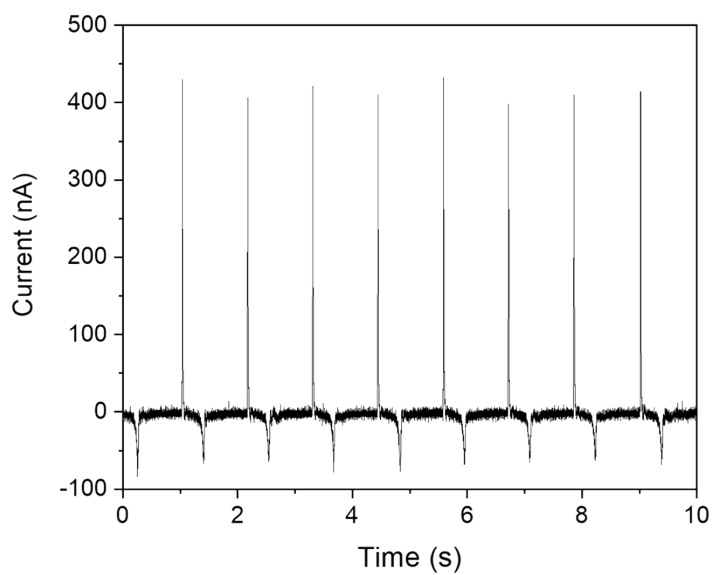
**Figure S8.** Voltage peaks observed in contact-separation between smooth APTES-PDMS and smooth TMSPMA-PDMS.



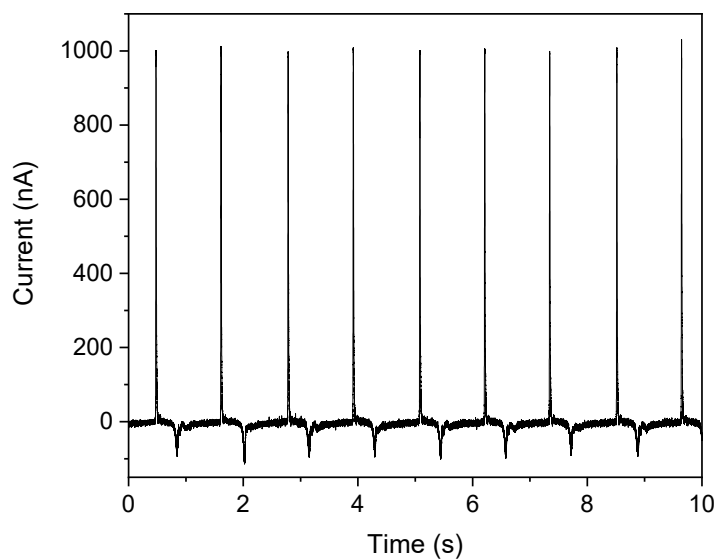
**Figure S9.** Current peaks observed in contact-separation between smooth APTES-PDMS and smooth TMSPMA-PDMS.



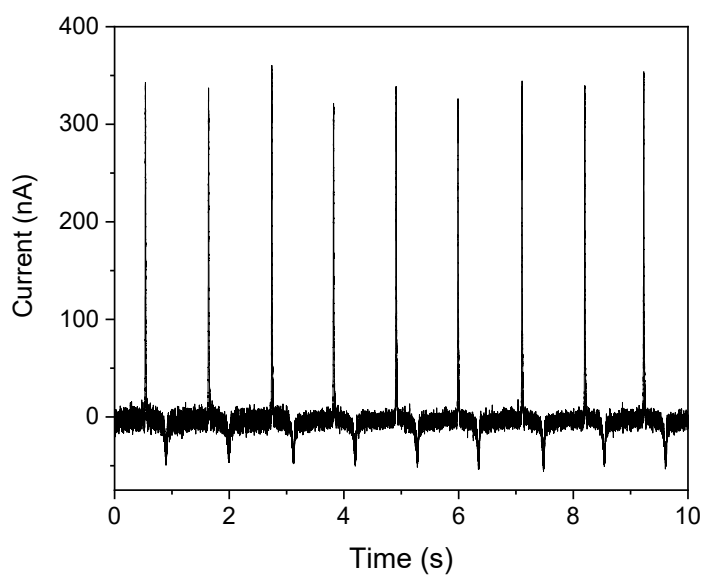
**Figure S10.** SEM images of (A) smooth PDMS and (B) rough PDMS.



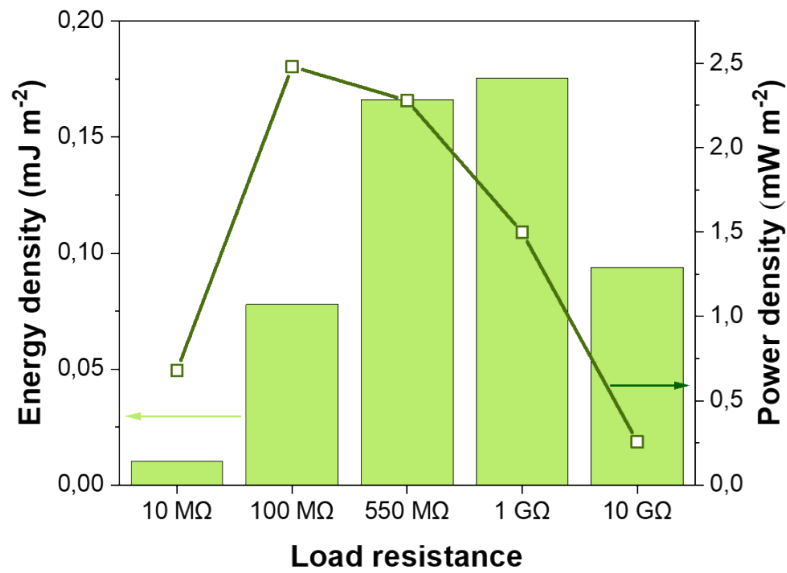
**Figure S11.** Current peaks observed in contact-separation between rough APTES-PDMS and smooth TMSPMA-PDMS.



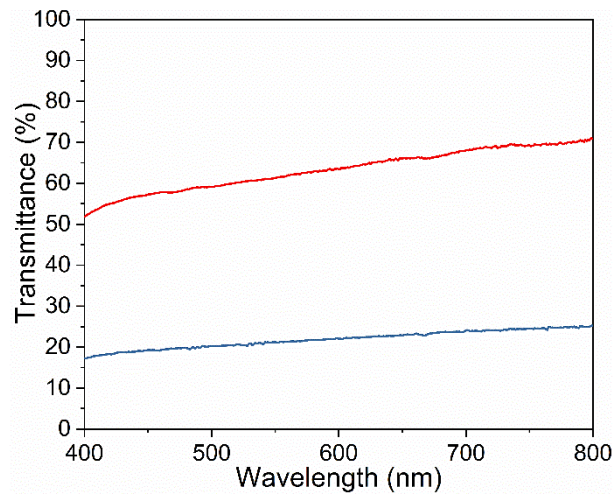
**Figure S12.** Current peaks observed in contact-separation between smooth APTES-PDMS and rough TMSPMA-PDMS.



**Figure S13.** Current peaks observed in contact-separation between rough APTES-PDMS and rough TMSPMA-PDMS.



**Figure S14.** Energy and power density of TENG device based on APTES-PDMS and TMSPMA-PDMS.



**Figure S15.** Transmittance of TENG devices based on smooth APTES-PDMS vs smooth TMSPMA-PDMS layers (red line) and of TENG device based on smooth APTES-PDMS vs rough TMSPMA-PDMS layers (blue line).