

Author's Accepted Manuscript

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PII: S2211-2855(17)30110-6
DOI: <http://dx.doi.org/10.1016/j.nanoen.2017.02.032>
Reference: NANOEN1808

To appear in: *Nano Energy*

Received date: 20 December 2016
Revised date: 13 February 2017
Accepted date: 17 February 2017

Cite this article as: Ju Hyun Lee, Insang Yu, Seung Hyun, Jin Kon Kim and Unyong Jeong, Remarkable Increase in Triboelectrification by Enhancing the Conformable Contact and Adhesion Energy with a Film-Covered Pillar Structure *Nano Energy*, <http://dx.doi.org/10.1016/j.nanoen.2017.02.032>

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Remarkable Increase in Triboelectrification by Enhancing the Conformable Contact and Adhesion Energy with a Film-Covered Pillar Structure

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Abstract

Structural modification of the surface has been widely investigated in triboelectric energy generation to improve the power harvested. Large contact area, large surface area and good dielectric performance are the basic design principles needed for the structures, while energy harvesting from low-energy mechanical motions is desirable. This work suggests that a film-covered pillar structure made of polydimethylsiloxane (PDMS) improved its output performance by satisfying all the basic design parameters, especially, the conformable contact and easy deformation. The contact area and the adhesion energy of the film-covered pillar structure are quantitatively compared with those from the flat PDMS substrates and the pillar-only structures. We report that the film-covered pillar structure remarkably enhances

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