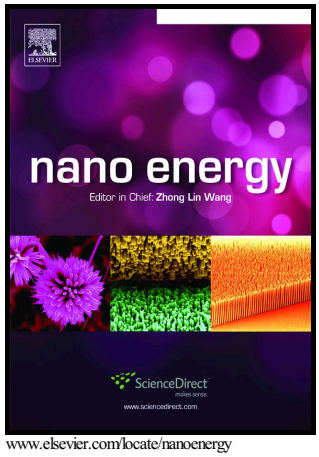

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PII: S2211-2855(16)30177-X
DOI: http://dx.doi.org/10.1016/j.nanoen.2016.05.048
Reference: NANOEN1313

To appear in: *Nano Energy*

Received date: 21 April 2016
Revised date: 23 May 2016
Accepted date: 27 May 2016

Cite this article as: Kyeong Nam Kim, Yun Kyung Jung, Jinsung Chun, Byeong Uk Ye, Minsu Gu, Eunyoung Seo, Seongsu Kim, Sang-Woo Kim, Byeong-Su Kim and Jeong Min Baik, Surface Dipole Enhanced Instantaneous Charge Pair Generation in Triboelectric Nanogenerator, *Nano Energy* http://dx.doi.org/10.1016/j.nanoen.2016.05.048

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Abstract

Developing a successful strategy to maximize the surface charge density is crucial to speed-up the commercialization success of triboelectric nanogenerator. Here, for the first time, the fabrication of positive triboelectric material to donate electrons efficiently to dielectrics is reported, by increasing the stretchability for the uniform contact and by introducing a functional group for the surface potential control. A highly stretchable and conductive film with Ag nanowires and PDMS was fabricated as a base material, in which the portion of nanowires exposed above the embedding surface should be accurately controlled. In specific, positively charged 4-(dimethylamino)pyridine (DMAP) coated Au nanoparticles, prepared by phase transfer method, are coated. The DMAP lowers the effective work function of the nanoparticles by a permanent dipole induced at the DMAP–Au interface and enhances the electron transfer to the dielectrics, confirmed by the Kelvin probe force microscope measurement. The designed nanogenerator gives an output performance up to 80 V and 86 μA, and 2.5 mW in output power, 2.5 times enhancement compared with the conventional TENG.