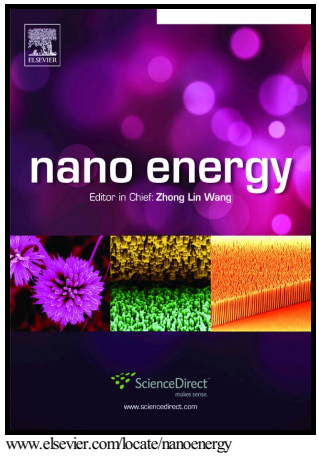

www.elsevier.com/locate/nanoenergy

Triboelectrification-Enabled Touch Sensing for Self-Powered Position Mapping and Dynamic Tracking by a Flexible and Area-Scalable Sensor Array

Xiao Xiao Zhu, Xian Song Meng, Shuang Yang Kuang, Xian Di Wang, Guang Zhu, Zhong Lin Wang

PII: S2211-2855(17)30561-X
DOI: http://dx.doi.org/10.1016/j.nanoen.2017.09.025
Reference: NANOEN2201

To appear in: *Nano Energy*

Received date: 11 July 2017
Revised date: 9 September 2017
Accepted date: 11 September 2017

Cite this article as: Xiao Xiao Zhu, Xian Song Meng, Shuang Yang Kuang, Xian Di Wang, Guang Zhu and Zhong Lin Wang, Triboelectrification-Enabled Touch Sensing for Self-Powered Position Mapping and Dynamic Tracking by a Flexible and Area-Scalable Sensor Array, *Nano Energy,* http://dx.doi.org/10.1016/j.nanoen.2017.09.025

Triboelectrification-Enabled Touch Sensing for Self-Powered Position Mapping and Dynamic Tracking by a Flexible and Area-Scalable Sensor Array

Xiao Xiao Zhu[1], Xian Song Meng [1], Shuang Yang Kuang[1], Xian Di Wang[1], Guang Zhu[1], Zhong Lin Wang[1,2]**

1 Beijing Institute of Nanoenergy and Nanosystems, Chinese Academy of Sciences, Beijing, 100083, China.

2 School of Materials Science and Engineering, Georgia Institute of Technology, Atlanta, GA 30332, USA.

Email: zhuguang@binn.cas.cn, zlwang@binn.cas.cn

Keywords: touch sensor, triboelectrification, energy conversion, sensor array, image mapping

A touch sensor is essentially a transducer that transforms physical touches into measurable electric signals. Here, we report a fabric-based self-powered triboelectric sensor array. Individual sensing units are constituted by intersections between row electrode lines and column electrode lines that have complementary patterns. When a sensing unit is touched, surface triboelectrification coupled with electrostatic induction generates an output voltage as high as ~25 V on both the row and column electrode lines. Through proper shielding design, exceptionally low crosstalk between adjacent electrode lines is achieved, which gives an optimal crosstalk of 40 dB. A prototype of a visualized sensing system is demonstrated, which can display the position, the trajectory and the approximate profile of multiple contact objects in real time. The ITESA presented in this work does not rely on power supplies and possesses great flexibility as well as robustness. It can be scaled in area and is