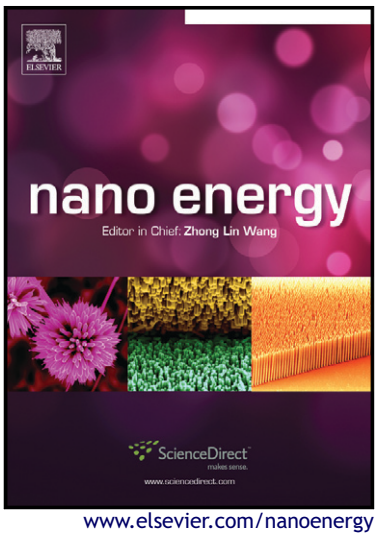

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PII: S2211-2855(14)00102-5
DOI: http://dx.doi.org/10.1016/j.nanoen.2014.05.018
Reference: NANOEN392

To appear in: *Nano Energy*

Received date: 13 May 2014
Accepted date: 29 May 2014

Cite this article as: Simiao Niu, Yu Sheng Zhou, Sihong Wang, Ying Liu, Long Lin, Yoshio Bando, Zhong Lin Wang, Simulation method for Optimizing the performance of an integrated triboelectric nanogenerator energy harvesting system, *Nano Energy*, http://dx.doi.org/10.1016/j.nanoen.2014.05.018

Simulation Method for Optimizing the Performance of an Integrated Triboelectric Nanogenerator Energy Harvesting System

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Abstract

Demonstrating integrated triboelectric nanogenerator energy harvesting systems that contain triboelectric nanogenerators, power management circuits, signal processing circuits, energy storage elements, and/or load circuits are core steps for practical applications of triboelectric nanogenerators. Through the design flow of such systems, theoretical simulation plays a critical role. In this manuscript, we provided a new theoretical simulation method for integrated triboelectric nanogenerator systems through integrating the equivalent circuit model of triboelectric nanogenerators into SPICE software. This new simulation method was validated by comparing its results with analytical solutions in some specific triboelectric nanogenerator systems. Finally, we employed this new simulator to analyze the performance of an integrated triboelectric nanogenerator system with a power management circuit. From the study of the influence