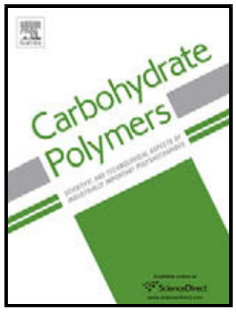

Title: Variable Piezoelectricity of Electrospun Chitin

Authors: Reva M. Street, Tatyana Huseynova, Xin Xu, Prashant Chandrasekaran, Lin Han, Wan Y. Shih, Wei-Heng Shih, Caroline L. Schauer

PII: S0144-8617(18)30481-8
DOI: https://doi.org/10.1016/j.carbpol.2018.04.086
Reference: CARP 13540

To appear in:

Received date: 18-1-2018
Revised date: 3-4-2018
Accepted date: 23-4-2018

Please cite this article as: Street, Reva M., Huseynova, Tatyana., Xu, Xin., Chandrasekaran, Prashant., Han, Lin., Shih, Wan Y., Shih, Wei-Heng., & Schauer, Caroline L., Variable Piezoelectricity of Electrospun Chitin.*Carbohydrate Polymers* https://doi.org/10.1016/j.carbpol.2018.04.086

Elsevier Editorial System(tm) for
Carbohydrate Polymers

Manuscript Draft

Manuscript Number: CARBPOL-D-18-00227R1

Title: Variable Piezoelectricity of Electrospun Chitin

Article Type: Research Paper

Keywords: Piezoelectricity, Electrospinning, Chitin, Collagen, Gelatin

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Abstract: Investigations into the piezoelectricity of natural polymers is a continuing area of interest due to their potential role in the complex interplay of mechanical and electrical forces present in biological organisms. Their synthetic counterparts, when electrospun using the air gap electrospinning method, are known to have increased crystallinity and tensile strength as compared to randomly aligned nanofibers composed of the same constituent polymers. Using the air gap electrospinning method with the naturally-occurring, semi-crystalline polymer chitin, the nanofibers were determined to have a 300% increase in tensile strength over randomly collected ones. Additionally, a 400% increase in piezoelectric response in the aligned nanofiber chitin mats was measured. The increased tensile strength and piezoelectricity in aligned chitin nanofibers is a consequence of an increase in α-chitin crystallinity in the nanofibers induced by the air gap collection method.