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Engineering & Scientific Consulting

Soshana Smith, Ph.D.

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Professional Profile

Dr. Smith is a fiber and textile scientist who specializes in non-woven technologies and polymers used in renewable energy sources. Her research interests include the development and characterization of non-woven materials for use in high performance lithium ion batteries as well as investigation of the material reliability of photovoltaic backsheets. Dr. Smith has experience working in a start-up environment, as well as federal and academic labs. She routinely utilizes a variety of techniques for the design and characterization of polymeric materials including mechanical and thermal analysis (DMA, DSC, and TGA), microscopy (optical, SEM, TEM), and spectroscopy (FTIR, UV-Vis, and confocal fluorescence).

Before joining Exponent, Dr. Smith worked as a scientist for Axium Nano LLC where she developed new materials for use in lithium ion batteries. In this position, she co-led a team that designed and optimized production processes both in the lab and pilot scale and her team was able to develop a patented polymer/ceramic hybrid separator, which exceeded thermal stability and cycling performance industry standards. In addition to her startup experience, Dr. Smith worked at NIST (National Institute of Standards and Technology) as a Materials Research Engineer where she utilized accelerated weathering techniques to study the degradation of polymer back sheets used for photovoltaic modules.

Academic Credentials & Professional Honors

Ph.D., Fiber Science, Cornell University, 2016

M.S., Fiber Science, Cornell University, 2012

B.S., Chemical Engineering, Cornell University, 2009

NREL PVRW 2022 Outstanding Poster Award - Feb 2022

Materials for a Sustainable Future IGERT Fellowship 2011 - 2013

National Science Foundation EAPSI Fellowship 2011

Prior Experience

Materials Research Engineer, National Institute for Standards and Technology, 2020-2022

Post-Doctoral Associate, Cornell University, 2019-2020

Senior Scientist, Axium Nano LLC, 2016-2018

Patents

U.S. Patent No. 20210167463A1: “Polymer-Ceramic Hybrid Separator Membranes, Precursors, And Manufacturing Processes” 2019 (Smith, Soshana; Carlin, Joseph M.; Kim, Kyoung Woo; Joo, Yong Lak)

U.S. Patent No. 20180337379; “Hybrid separators and the manufacture thereof” 2018 (Joo, Yong Lak, Carlin, Joseph M.; Smith, Soshana)

Publications

S.A. Smith., S. Mitterhofer, S.L. Moffitt et al. Long-term durability of transparent backsheets for bifacial photovoltaics: An in-depth degradation analysis. *Solar Energy Materials and Solar Cells*. 256 (2023) 112309.

S.A. Smith, L. Perry, S. Watson, et al. Transparent backsheets for bifacial photovoltaic (PV) modules: Material characterization and accelerated laboratory testing. *Prog Photovolt Res Appl*. (2021); 1- 11.

S.A. Smith; M. Ozturk; M.W. Frey, Biodegradation of Cotton Fabrics Treated with Common Finishes. *Cellulose* (2021)

S.A. Smith; K.E. Goodge, M.J. Delaney, A.A. Strzyk, N.L. Tansey, M.W. Frey, A Comprehensive Review of The Covalent Immobilization of Biomolecules onto Electrospun Nanofibers. *Nanomaterials*, 10 (2020) 2142.

S.A. Smith; M.J. Delaney; M.W. Frey, Anti-Escherichia coli Functionalized Silver-Doped Carbon Nanofibers for Capture of E. coli in Microfluidic Systems. *Polymers*. 12 (2020) 1117.

S.A. Smith, J.H. Park, B.P. Williams, Y.L. Joo, Polymer/ceramic co-continuous nanofiber membranes via room-curable organopolysilazane for improved lithium-ion battery performance, *Journal of Materials Science*. 52 (2017) 3657–3669.

S.A. Smith, B.P. Williams, Y.L. Joo, Effect of polymer and ceramic morphology on the material and electrochemical properties of electrospun PAN/polymer derived ceramic composite nanofiber membranes for lithium ion battery separators, *Journal of Membrane Science*. 526 (2017) 315–322.

J. Kim, J.M. Carlin, S.A. Smith, J. Yin, Y.L. Joo, Thermal restacking of graphene structure to improve lithium-air battery cyclability, *Electrochemistry Communications*. 70 (2016) 43–46.