

Exponent®
Engineering & Scientific Consulting

Timothy Bogart, Ph.D., P.E.

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Professional Profile

Dr. Bogart is a licensed professional engineering specializing in batteries and battery systems. He provides consultation on all aspects of the battery life cycle from cell qualification to failure analysis and recall support. He uses his wealth of experience to assist in battery vendor selection, quality of manufacture assessments and factory audits, performance and reliability testing, and safety evaluations for products in multiple industries including consumer and commercial electronics, electric vehicles, energy storage systems, and medical devices.

Dr. Bogart is knowledgeable on a variety commercial batteries including lithium-ion, alkaline, and lead-acid in addition to next generation cell chemistries such as solid-state, lithium metal, and silicon-based batteries.

Prior to joining Exponent, Dr. Bogart led the development of a silicon-based material for lithium-ion battery anodes at Nexeon, Ltd. gaining experience with material production as well as commercial fabrication and testing of batteries. Additionally, he was a National Defense Science and Engineering Graduate Fellow at The University of Texas at Austin where he conducted research focused on the design, synthesis, and characterization of silicon and germanium nanowires for next generation lithium-ion battery anodes.

Academic Credentials & Professional Honors

Ph.D., Chemical Engineering, University of Texas, Austin, 2014

B.Ch.E., Chemical Engineering, University of Delaware, 2010

National Defense Science and Engineering (NDSEG) Graduate Research Fellowship, 2012-2014

Graduate Dean's Prestigious External Fellowship, 2012

Cockrell School of Engineering Thrust 2000 Fellowship, 2010-2012

Licenses and Certifications

Professional Engineer Chemical, California, #6952

Certified Fire and Explosion Investigator (CFEI)

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Prior Experience

Senior Scientist, Anode Materials Development, Nexeon Ltd., 2015-2017

NDSEG Research Fellow, Department of Chemical Engineering, The University of Texas at Austin, 2010-2014

Professional Affiliations

American Institute of Chemical Engineers

The Electrochemical Society

Patents

Korgel BA, Chockla AM, Bogart TD. Anode Materials for Li-Ion Batteries WO 2014015335 A1, Jul 20, 2012

Neikirk DP, Parsupathy P, Zhang S, Leonhardt B, Ekerdt JG, Korgel BA, Holmberg VC, Shipman, Catherine D.; Bogart TD, Chockla, Aaron M. Passive Wireless Self-Resonant Sensor US 9291586 B2, May 5, 2012

Bogart T, Foxon S, Farrell J, Bent D, Scarlett D. Electroactive Materials for Metal-ion Batteries US 20200099043A1

Publications

Xiaotang L, Bogart TD, Meng G, Wang C, Korgel BA. In situ TEM observations of Sn-containing silicon nanowires undergoing reversible pore formation due to fast lithiation/delithiation kinetics. J. Phys. Chem. C 2015; 119(38):21889-21895.

Constantinou M, Stolojan V, Rajeev KP, Hinder SJ, Fisher B, Bogart T, Korgel BA, Shkunov M. Interface passivation and trap reduction via a solution-based method for near-zero hysteresis nanowire field-effect transistors. ACS Appl. Mater. Interfaces 2015; 7(40):22115-22120.

Bogart TD, Xiaotang L, Meng G, Wang C, Korgel BA. Enhancing the lithiation rate of silicon nanowires by the inclusion of tin. RSC Advances 2014; 4:42022-42028.

Bogart TD, Oka D, Gu XL, Meng; Wang C, Korgel BA. Lithium ion battery peformance of silicon nanowires with carbon skin. ACS Nano 2014; 8:915-922.

Bogart TD, Xiaotang L, Korgel BA. Precision synthesis of silicon nanowires with crystalline core and amorphous shell. Dalton Transactions 2013; 42(35):12675-12680.

Bogart TD, Chockla AM, Korgel BA. High capacity lithium ion battery anodes of silicon and germanium. Current Opinions in Chemical Engineering 2013; 2(3):286-2939.

Yu Y, Hessel CM, Bogart TD, Panthani MG, Rasch MR, Korgel BA. Room temperature hydrosilylation of silicon nanocrystals with bifunctional terminal alkenes. Langmuir 2013: 29(5):1533-1540.

Xiaotang L, Hessel CM, Yu Y, Bogart TD, Korgel BA. Colloidal luminescent silicon nanorods. Nano Letters 2013; 13(7):3101-3105.

Harvey TB, Mori I, Stolle CJ; Bogart TD, Ostrowski DP, Glaz MS, Du J, Pernik DR, Akhavan VA, Kesrouani H, Vanden Bout DA, Korgel BA. Copper Indium Gallium Selenide (CIGS) photovoltaic devices

made using multistep selenization of nanocrystal films. ACS Applied Materials & Interfaces 2013; 5(18):9134-9140.

Holmberg VC, Bogart TD, Chockla AM, Hessel CM, Korgel BA. Optical properties of silicon and germanium nanowire fabric. Journal of Physical Chemistry C 2012);116(42):22486-22491.

Chockla AM, Bogart TD, Hessel CM, Klavetter K, Mullins CB, Korgel BA. Influences of gold, binder and electrolyte on silicon nanowire performance in Li-Ion batteries. Journal of Physical Chemistry C 2012; 116(34):18079-18086.

Chockla AM, Panthani MG, Holmberg VC, Hessel CM, Reid DK, Bogart TD, Harris JT, Mullins CB, Korgel BA. Electrochemical lithiation of graphene-supported silicon and germanium for rechargeable batteries. Journal of Physical Chemistry C 2012; 116(22):11917-11923.

Albert JNL, Young W-S, Lewis RL, III, Bogart TD, Smith JR, Epps III, Thomas H. Systematic study on the effect of solvent removal rate on the morphology of solvent vapor annealed ABA triblock copolymer thin films. ACS Nano 2012; 6(1):459-466.

Albert JNL, Bogart TD, Lewis RL, Beers KL, Fasolka MJ, Hutchison JB, Vogt BD, Epps IIITH. Gradient solvent vapor annealing of block copolymer thin films using a microfluidic mixing device. Nano Letters 2011; 11(3):1351-1357.

Chockla AM, Harris JT, Akhavan VA, Bogart TD, Holmberg VC, Steinhagen, Chet; Mullins CB, Stevenson KJ, Korgel BA. Silicon nanowire fabric as a lithium ion battery electrode material. Journal of the American Chemical Society 2011; 133(51):20914-20921.

Presentations

Hirsh H, Bogart T, Colella F, Spray R, Beers K. Experimental Approach for the Rational Design of Battery Packs. Poster presentation, Advanced Automotive Battery Conference (AABC), San Diego, CA, December 2022.

Beers K, Spray R, Bogart T, Harding J, Faenza N. Lithium-ion Cell Failure Mechanisms and Mitigation Strategies. 2021 IEEE Symposium on Product Safety and Compliance Engineering (ISPCE), Virtual, September 2021.

Beers K, Licht R, Bogart T, Cohn A, Burke C, Cai Z, Horn Q, Spray R. Looking Under the Hood: Case Studies in 18650 Component and Performance Degradation. Oral presentation, NASA Aerospace Battery Workshop, Virtual, November 2020.

Burke C, Licht R, Cohn A, Cai Z, Lee K, Godshaw J, Beers K, Adams R, Bogart T. Evaluating Internal Structural Changes in Commercial 18650's. Poster presentation, Advanced Automotive Battery Conference (AABC), Virtual, November 2020.

Beers K, Licht R, Spray R, Burke C, Cohn A, Bogart T, Forman J, Rucker R, Godshaw J, Harding J, White K, Horn Q. Oral presentation, Testing Tools and Methodologies for Lithium-ion Cell Qualification. 2019 IEEE Symposium on Product Safety and Compliance Engineering (ISPCE), San Jose, CA, May 2019.

Beers K, Spray R, White K, Horn Q, Bogart T, Forman J, Licht R. Fundamentals of Lithium-ion Technology: Cell Safety and Performance. Oral presentation, 2018 Safety Summit San Diego (SSSD), San Diego, CA, October 2018.

Bogart T, Licht R, Beers K, Godshaw J, Rucker R, Forman J, White K. Understanding Degradation of Lithium-Ion Battery Performance. Poster presentation, Advanced Automotive Battery Conference (AABC), San Diego, CA, 2018.

Bogart TD, Xiaotang L, Meng ODG, Wang C, Korgel BA. High performance silicon nanowire lithium ion battery anodes. 2014 AIChE Annual Meeting.

Bogart TD, Chockla AM, Klavetter KC, Hessel CM, Mullins CB, Korgel BA. Solution-grown Si and Ge nanowires as high capacity anodes for lithium-ion batteries. International Solvothermal and Hydrothermal Association (ISHA) 2013 Conference.

Bogart TD, Holmberg VC, Rasch MR, Korgel BA. Surface functionalization of Ge and Si nanowires. Nanowires 2011 Conference (Poster).