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Professional Profile

Dr. Cohn is an experienced materials scientist specializing in battery technology. At Exponent, he leads a team focused on helping clients navigate challenges across the entire life cycle of their batteries and battery-powered products, including projects focused on technology due diligence, battery cell and pack quality evaluations, cycling studies, charging protocol analysis, customized abuse testing, root cause failure analysis, and product recalls involving the Consumer Product Safety Commission (CPSC).

He supports clients across a range of battery sectors, including consumer electronics, electric vehicles, portable battery backup systems, and residential and utility battery energy storage systems (BESS). Dr. Cohn is a member of the Standard Technical Panel for UL 2743 Portable Power Packs. He has also guest lectured at University of California schools on lithium-ion battery technology and failure analysis techniques.

Dr. Cohn has served as an expert witness in intellectual property (IP) disputes, leveraging his skills analyzing batteries from the macro scale down to the atomic scale. He has supported due diligence and IP litigation related to battery manufacturing, electrode design, separator design, crystal structure of active material, mechanical properties of current collectors, and nanoscale conductive additives and active material coatings. He has also conducted dozens of inspections and battery fire investigations.

Dr. Cohn has experience working on current and emerging battery chemistries, including lithium ion (NMC, NCA, LCO, LFP), rechargeable lithium metal, sodium ion, lithium thionyl chloride (Li/SOCl2), and lithium manganese dioxide (Li/MnO2). He has led the analysis of a wide variety of cell types, including large format 314 Ah and 628 Ah prismatic LFP cells for BESS applications. He is experienced at analyzing batteries using X-ray imaging, CT scanning, cell teardowns, cryo resistance, cryo HiPot, reference electrode testing, cycling, and electrical and thermal abuse testing. He is also skilled at characterizing battery materials using Raman spectroscopy, X-ray diffraction (XRD), scanning electron microscopy with energy dispersive X-ray spectroscopy (SEM-EDS), scanning transmission electron microscopy (STEM), focused ion beam (FIB), and particle size analysis techniques.

As a National Science Foundation Graduate Research Fellow at Vanderbilt University, Dr. Cohn's research was focused on the design, development, and characterization of new energy storage systems, including the development of the first “anode-free” sodium battery and the first anode-free battery incorporating a nucleation layer on the negative current collector. He also collaborated with colleagues to develop intercalation-driven display technology (US Patent 11,287,642) and a silicon supercapacitor integrated into a solar cell.

During his research, Dr. Cohn prepared and tested a wide range of battery electrode materials including polyanionic cathodes (e.g., sodium vanadium phosphate), Prussian blue analogues, carbon materials (e.g., activated carbon, hard carbon, graphite, graphene, carbon nanotubes), and alloying anodes (e.g., tin, bismuth, silicon). To help better understand underlying battery mechanisms, he conducted in-situ

studies of intercalation and electrochemical plating processes. He also gained experience with a range of synthesis and deposition techniques, including sol-gel synthesis, wet-chemical synthesis, hydrothermal synthesis, solid-state synthesis, aluminum anodization, chemical vapor deposition (CVD), porous silicon etching, and atomic layer deposition (ALD).

Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering, Vanderbilt University, 2018

B.S., Physics, Tufts University, 2011

NSF Graduate Research Fellowship, National Science Foundation, 2015-2018

Prior Experience

Energy Analyst, Pace Energy and Climate Center, 2011-2013

Patents

US Patent 11,287,642. Electrochemically Actuated Optical Modulator. (Valentine JG, Coppens Z, Pint CL, Cohn AP).

International Application No. PCT/US2017/059781: Electrochemical Cells and Methods of Making and Using Thereof. (Cohn AP, Pint CL).

Publications

Cohn AP, Hayes T, Harding J, Horn Q. "The Low-Voltage Limits of Lithium-Ion Batteries: Overdischarge and Degradation from a Safety Perspective." ISTFA 2022: Conference Proceedings from the 48th International Symposium for Testing and Failure Analysis, October 30–November 3, 2022, Pasadena Convention Center, Pasadena, California, USA, pp. 47–50.

Hayes T, Cohn AP, Kasse R, Sanchez H. "Advanced Lithium Ion Battery Failure Analysis: An Evolving Methodology for an Evolving Technology." ISTFA 2022: Conference Proceedings from the 48th International Symposium for Testing and Failure Analysis, October 30–November 3, 2022, Pasadena Convention Center, Pasadena, California, USA, pp. 51–57.

Moyer K, Donohue J, Ramanna N, Cohn AP, Muralidharan N, Eaves J, Pint CL. "High rate potassium ion and sodium ion batteries by co intercalation anodes and open framework cathodes." Nanoscale 2018; 10:13335–13342.

Cohn AP, Metke T, Donohue J, Muralidharan N, Share K, Pint CL. "Rethinking sodium-ion anodes as nucleation layers for anode free batteries." Journal of Materials Chemistry A 2018; 6:23875–23884.

Muralidharan N, Brock C, Cohn AP, Schauben D, Carter R, Oakes L, Walker DG, Pint CL. "Tunable mechanochemistry of lithium battery electrodes." ACS Nano 2017; 11:6243–6251.

Cohn AP, Muralidharan N, Carter R, Share K, Pint CL. "An anode free sodium battery through in situ plating of sodium metal." Nano Letters 2017; 17:1296–1301.

Carter R, Oakes L, Douglas A, Muralidharan N, Cohn AP, Pint CL. "A sugar-derived room-temperature sodium sulfur battery with long term cycling stability." Nano Letters 2017; 17:1863–1869.

Carter R, Oakes L, Muralidharan N, Cohn AP, Douglas A, Pint CL. "Polysulfide anchoring mechanism revealed by atomic layer deposition of V□O□ and sulfur filled carbon nanotubes for lithium sulfur

batteries." ACS Applied Materials & Interfaces 2017; 9:7185–7192.

Carter R, Ejorh D, Share K, Cohn AP, Douglas A, Muralidharan N, Tovar TM, Pint CL. "Surface oxidized mesoporous carbons derived from porous silicon as dual polysulfide confinement and anchoring cathodes in lithium sulfur batteries." Journal of Power Sources 2016; 330:70–77.

Muralidharan N, Westover AS, Sun H, Galioto N, Carter R, Cohn AP, Oakes L, Pint CL. "From the junkyard to the power grid: ambient processing of scrap metals into nanostructured electrodes for ultrafast rechargeable batteries." ACS Energy Letters 2016; 1:1034–1041.

Oakes L, Muralidharan N, Cohn AP, Pint CL. "Catalyst morphology matters for lithium–oxygen battery cathodes." Nanotechnology 2016; 27:495404.

Oakes L, Carter R, Hanken T, Cohn AP, Share K, Schmidt B, Pint CL. "Interface strain in vertically stacked two dimensional heterostructured carbon–MoS_2 nanosheets controls electrochemical reactivity." Nature Communications 2016; 7:11796.

Li M, Carter R, Cohn AP, Pint CL. "Interconnected foams of helical carbon nanofibers grown with ultrahigh yield for high capacity sodium ion battery anodes." Carbon 2016; 107:109–115.

Share K, Carter R, Nikolaev P, Hooper D, Oakes L, Cohn AP, Rao R, Puretzky AA, Geohegan DB, Maruyama B. "Nanoscale silicon as a catalyst for graphene growth: mechanistic insight from in situ Raman spectroscopy." Journal of Physical Chemistry C 2016; 120:14180–14186.

Muralidharan N, Carter R, Oakes L, Cohn AP, Pint CL. "Strain engineering to modify the electrochemistry of energy storage electrodes." Scientific Reports 2016; 6:27542.

Share K, Cohn AP, Carter R, Rodgers B, Pint CL. "Role of nitrogen doped graphene for improved high capacity potassium ion battery anodes." ACS Nano 2016; 10:9738–9744.

Cohn AP, Muralidharan N, Carter R, Share K, Oakes L, Pint CL. "Durable potassium ion battery electrodes from high rate co intercalation into graphitic carbons." Journal of Materials Chemistry A 2016; 4:14954–14959.

Share K, Cohn AP, Carter R, Pint CL. "Mechanism of electrochemical potassium ion intercalation staging in few layered graphene from in situ Raman spectroscopy." Nanoscale 2016; 8:16435–16439.

Cohn AP, Share K, Carter R, Oakes L, Pint CL. "Ultrafast solvent assisted sodium ion intercalation into highly crystalline few layered graphene." Nano Letters 2016; 16:543–548.

Share K, Lewis J, Oakes L, Carter R, Cohn AP, Pint CL. "Tungsten diselenide (WSe_2) as a high capacity, low overpotential conversion electrode for sodium ion batteries." RSC Advances 2015; 5:101262–101267.

Carter R, Chatterjee S, Gordon E, Share K, Erwin WR, Cohn AP, Bardhan R, Pint CL. "Corrosion resistant three dimensional nanotextured silicon for water photo oxidation." Nanoscale 2015; 7:16755–16762.

Oakes L, Cohn AP, Westover AS, Pint CL. "Electrophoretic stabilization of freestanding pristine graphene foams with carbon nanotubes for enhanced optical and electrical response." Materials Letters 2015; 159:261–264.

Cohn AP, Erwin WR, Share K, Oakes L, Westover A, Carter R, Bardhan R, Pint CL. "All silicon electrode photo capacitor for integrated energy storage and conversion." Nano Letters 2015; 15:2727–2731.

Carter R, Oakes L, Cohn AP, Holzgrafe J, Zarick HF, Chatterjee S, Bardhan R, Pint CL. "Solution assembled single walled carbon nanotube foams: superior performance in supercapacitors, lithium ion,

and lithium–air batteries." Journal of Physical Chemistry C 2014; 118:20137–20151.

Cohn AP, Oakes L, Carter R, Chatterjee S, Westover A, Share K, Pint CL. "Assessing the improved performance of freestanding, flexible graphene and carbon nanotube hybrid foams for lithium ion battery anodes." Nanoscale 2014; 6:4669–4675.

Westover AS, Share K, Carter R, Cohn AP, Oakes L, Pint CL. "Direct integration of a supercapacitor into the backside of a silicon photovoltaic device." Applied Physics Letters 2014; 104.

Presentations

Cohn AP. Cycling-Induced Electrode Deformation and the Potential Safety Implications. Oral presentation, 16th Annual Battery Safety Summit, Chicago, Illinois, August 13, 2026.

Cohn AP. Cryo-Resistance and Cryo-HiPot to Detect and Locate Internal Short Circuits in Lithium-ion Batteries. Oral presentation, 15th Annual Battery Safety Summit, Bethesda, Maryland, November 13, 2025.

Ells D, Cohn AP. Evaluating the Design and Manufacturing Quality of Lithium Iron Phosphate (LFP) Batteries. Oral presentation, LFP Battery Tech 2025, Detroit, Michigan, September 8, 2025.

Cohn AP. A Discussion on Lithium Iron Phosphate Battery Safety and the Importance of Cell Quality. Oral presentation, 14th Annual Battery Safety Summit, Alexandria, Virginia, November 5, 2024.

Torelli D, Cohn AP, Hayes T. Beyond Performance Data: Evaluating Potential Safety Concerns of Alternative Cell Designs Through a Testing-Based Approach. Oral presentation, Advanced Automotive Battery Conference, Strasbourg, France, May 15, 2024

Cohn AP, Hayes T, Harding J, Horn Q. Over Discharge in Lithium-Ion Cells: Understanding the Negative Electrode Potential at Low Cell Voltages. Oral presentation, 12th Annual Battery Safety Summit, Tysons Corner, Virginia, October 13, 2022.

Hayes, TA, Cohn, AP, Sanchez, H. Advanced Failure Analysis for Lithium-Ion Batteries, Exponent Live Webinar, May 13, 2021.

Licht R, Cohn P, Beers K. The Effects of Cycling Protocols on Internal Cell Structure. Oral presentation, PlugVolt Battery Seminar 2019, Plymouth, MI, July 16, 2019.

Cohn AP, Pint CL. Developing an Anode-Free Sodium Battery. Oral presentation, Materials Research Society Fall Meeting, Boston, MA, 2016.

Cohn AP and Pint CL. Cointercalation for Alternative Ion Storage. Oral presentation Materials Research Society Fall Meeting, Boston, MA, 2016.

Cohn AP, Share K, Carter R, Oakes L, and Pint CL. Ultrafast Sodium Ion Cointercalation in Few-Layered Graphene. Poster presentation, Gordon Research Conference on Batteries, Ventura, CA, 2016.