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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 back-up 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 led a range of battery intellectual property (IP) litigation projects with experience analyzing batteries from the macro scale down to the atomic scale. He has experience supporting IP litigation related to battery manufacturing, electrode design, separator design, 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, lithium thionyl chloride (Li/SOCl2), and lithium manganese dioxide (Li/MnO2). He has led the analysis of a large variety of cell types, including different 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, 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 battery chemistries, including sodium-ion and sodium metal systems for low-cost stationary energy storage. 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), 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.