Exponent®
Engineering & Scientific Consulting

Erick Ruoff, Ph.D.

Associate | Materials Science and Electrochemistry
Menlo Park
+1-650-688-6757 | eruoff@exponent.com

Professional Profile

Dr. Ruoff is trained in materials science and engineering, specializing in solid-state, sodium-ion, and lithium-ion battery systems. He has extensive experience in advanced battery materials and electrochemical characterization, as well as next-generation cell design for commercial, automotive, and grid-scale applications. At Exponent, he leverages his wide skillset to perform root-cause analyses, evaluate performance, and conduct quality assessments of batteries for a wide range of applications and industries.

Dr. Ruoff possesses a broad technical background in battery materials synthesis, electrochemical testing, and cell engineering. He is experienced in applying characterization methods, including SEM/EDS, XRD, and spectroscopic techniques like XPS and NMR, to establish structure–property relationships, assess performance, and investigate battery failure modes. Dr. Ruoff also specializes in electrochemical diagnostics such as EIS, GITT, and cyclic voltammetry, along with electrode formulation, coating, and cell assembly for both conventional and solid-state batteries. His strong foundation in materials processing, testing, and analysis supports efficient experimentation and reliable problem-solving for performance evaluation for commercial batteries.

Prior to joining Exponent, Dr. Ruoff conducted graduate research at The University of Texas at Austin, where he led projects to advance low-cost, scalable battery chemistries. His research resulted in high-impact findings for advancing solid electrolyte ionic conductivity and high-voltage stability through novel material design as well as cathode–solid electrolyte interfacial phenomena in sodium solid-state batteries. Prior to his doctoral work, Dr. Ruoff gained hands-on experience through manufacturing engineering and R&D internship roles at Tesla, Form Energy, and Tokyo Electron, where he optimized battery fabrication techniques, evaluated battery electrode performance, and scaled electrochemical deposition processes.

Academic Credentials & Professional Honors

Ph.D., Materials Science and Engineering, University of Texas, Austin, 2026

B.S., Chemical Engineering, Northeastern University, 2021

M.S., Chemical Engineering, Northeastern University, 2021

Professional Affiliations

Electrochemical Society

Publications

Ruoff E, Manthiram A. Aluminum chloride-based catholytes for stable high-voltage solid-state sodium batteries. J. Mater. Chem. A 2026.

Lason K, **Ruoff E**, Manthiram A. Tunable crosslinked ether polymer network electrolytes for high-performance all-solid-state sodium batteries. Small Methods 2025; 9(12).

Ruoff E, Kmiec S, Manthiram A. Redox-active halide catholytes for enhanced energy density in solid-state sodium batteries. ACS Appl Mater Interfaces 2025; 17(12):18420–9.

Kmiec S, **Ruoff E** Manthiram A. A new class of oxyhalide solid electrolytes NaNbCl6-2xOx for solid-state sodium batteries. Angewandte Chemie International Edition 2024; 64(5):e202416979.

Ruoff E, Kmiec S, Manthiram A. Enhanced interfacial conduction in low-cost NaAlCl4 composite solid electrolyte for solid-state sodium batteries. Adv Energy Mater 2024; 14(37).

Kmiec S, Krupp K, **Ruoff E**, Manthiram A. Effects of oxide precursors on the structure and properties of Na3PS4–xOx glassy solid electrolytes. Chemistry of Materials 2024; 36(16):7867–76.

Ruoff E, Kmiec S, Manthiram A. Polycarbonate-based solid-polymer electrolytes for solid-state sodium batteries. Small 2023; 20(24).

Kmiec S, **Ruoff E**, Darga J, Bodratti A, Manthiram, A. Scalable glass-fiber-polymer composite solid electrolytes for solid-state sodium–metal batteries. ACS Appl Mater Interfaces 2023; 15(17):20946–57.

Presentations

Ruoff E, Manthiram A. Tailoring the anion chemistry of low-cost NaAlCl4 as a catholyte in solid-state sodium-ion batteries. Oral Presentation, Electrochemical Society 248th Meeting, Chicago, IL, 2025.

Peer Reviews

Solid State Ionics