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Engineering & Scientific Consulting

Jordan Aguirre, Ph.D., M.Sc.

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Professional Profile

Dr. Aguirre is a materials chemist with a background in composite solid electrolyte formulation, characterization and testing for advanced energy storage applications. He focuses on failure analysis and quality assessment of lithium-ion batteries across multiple commercial, industrial and medical applications with particular emphasis on consumer electronics and consumer products. He brings substantial experience with prototyping novel electrolytes, electrode formulation, and materials characterization techniques including Electrochemical Impedance Spectroscopy (EIS), full cell cycling, Raman spectroscopy, Cyclic and Linear Sweep Voltammetry (CV and LSV) to solve complex problems related to advanced battery systems. Dr. Aguirre additionally has nearly half a decade of experience with Thermogravimetric Analysis (TGA) and Differential Scanning Calorimetry (DSC), which he uses to identify and solve problems in material behavior at the early stages of development.

For his doctoral studies at Temple University, Dr. Aguirre performed extensive work on developing a novel hybrid solid electrolyte based on a lithium LAGP glass-ceramic electrolyte and a custom blend of silane polymer electrolyte. Using his extensive experience of materials characterization, he was able to prepare a lithium-resistant composite electrolyte with high thermal stability and good mechanical properties. He also helped prototype a full cell with a novel cocrystal-based electrolyte (adiponitrile and LiPF₆), leading to a nearly 50% improvement in cycle life when compared with the original design. Dr. Aguirre also has a background in inorganic chemistry, having served as a postdoctoral fellow at Boston University's chemistry department. At BU he synthesized a fluorinated ligand for use with first-row transition elements, as part of efforts to perform sustainable C-H activation on hydrocarbons and other cheap substrates.

Academic Credentials & Professional Honors

Ph.D., Chemistry, Temple University, 2021

M.S., Industrial Chemistry, University of Pisa, Italy, 2013

B.S., Industrial Chemistry, University of Pisa, Italy, 2011

Academic Appointments

Postdoctoral Associate Lecturer, Chemistry, Boston University, 2021-2022

Graduate Teaching Assistant, Chemistry, Temple University, 2015-2018

Prior Experience

Postdoctoral Associate Lecturer, Chemistry, Boston University, 2021-2022

Graduate Research Assistant, Temple University, 2016-2021

Graduate Teaching Assistant, Chemistry, Temple University, 2015-2018

Languages

Italian

English

Publications

Fall, B.; Prakash, P.; Aguirre, J.; Chereddy, S.; Chinnam, P. R.; Dikin, D.; Venkatnathan, A.; Wunder, S. L.; Zdilla, M. J. Soft solid co-crystals as alternatives to inorganic solid ceramic electrolytes for lithium batteries: thermally, electrochemically stable, highly conductive (Adiponitrile)₂LiPF₆. *Nature Materials* (Accepted Feb 13, 2023)

Chereddy, S.; Aguirre, J.; Dikin, D.; Wunder, S. L.; Chinnam, P. R. Gel electrolyte comprising solvate ionic liquid and methyl cellulose. *ACS Appl. Energy Mater.* 2020, 3, 1, 279-289

Prakash, P.; Aguirre, J.; Van Vliet, M. M.; Chinnam, P. R.; Dikin, D. A.; Zdilla, M. J.; Wunder, S. L.; and Venkatnathan, A. Unravelling the structural and dynamical complexity of the equilibrium liquid grain-binding layer in highly conductive organic crystalline electrolytes. *J. Mater. Chem. A*, 2018, 6, 4394

Presentations

Kremsa, O.; Anderson, A.; Aguirre, J.; Chereddy, S.; Kasaei, L.; Wunder, S.; Solid-liquid hybrid electrolytes: model systems for understanding interactions at the inorganic-organic interface. Poster presented at 4th annual BIC Industry Stakeholder's Luncheon, 2019 October 24, Indianapolis, IN

Aguirre, J.; Kwak, J.; Van Vliet, M.; Sonnenberg, L.; Wunder, S. L.; Zdilla, M. J.; Novel silane-based matrices for silica-mediated electrolyte-binder coatings in all-solid-state hybrid ceramic electrolytes for Lithium Metal Batteries. Poster Presented at NATAS 45th Annual Conference, 2018 August 6-10, Philadelphia, PA

Aguirre, J.; Chinnam, P. R.; Gau, M.; Zdilla, M.; Wunder, S.; Thermal study of DMSO·NaPS₂ cocrystal. Poster presented at TAFDV Fall Conference, 2017 Dec 5, Philadelphia, PA