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Title | Linking electrolyte bulk properties to interphase behaviour in lithium metal anodes

Abstract | Batteries with energy densities beyond those of commercial Li-ion chemistries are required to extend the electric revolution to aviation. Metallic lithium is the ultimate high-energy anode, but its successful implementation depends critically on the development of novel electrolytes that enable improved plating and stripping efficiency.

In this talk, I will discuss how bulk electrolyte transport and thermodynamic properties ^[1,2] are linked to the properties of the solid–electrolyte interphase ^[3,4]. I will further highlight how data-driven machine-learning approaches can leverage transport and thermodynamic descriptors to accelerate electrolyte discovery and optimisation ^[5].

References

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Bio | Professor [Mauro Pasta](#) is Professor of Applied Electrochemistry in the Department of Materials at the University of Oxford. He received his BSc, MSc, and PhD in Industrial Chemistry from the University of Milan, Italy, and subsequently carried out postdoctoral research in the Department of Materials Science and Engineering at Stanford University. Professor Pasta's research lies at the interface of electrochemistry and materials science, with a focus on developing battery chemistries beyond lithium-ion. His work aims to achieve a mechanistic understanding of solid electrode interphases and their relationship to bulk electrolyte properties, with the goal of enabling the rational design of next-generation electrolytes. In addition to his academic research, Professor Pasta is strongly committed to translating fundamental science into real-world impact. He currently leads the SOLBAT (solid-state lithium metal anode) programme at the Faraday Institution, which seeks to accelerate the development of solid-state battery technologies. He is a co-founder of four battery start-ups, through which he aims to accelerate the commercial deployment of next-generation energy storage solutions. Over the course of his career, Professor Pasta has received multiple honours, including the Corday–Morgan Prize (2025) and the Piontelli Award (2017), and was elected a Fellow of the Royal Society of Chemistry (FRSC) in 2021. He has published 115 peer-reviewed papers, which have received more than 19,200 citations (h-index 55).

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