

SEMINAR



State of the art of lithium batteries: EU scenario, worldwide scenario and future materials science directions

CENIMAT Amphitheater

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Prof. Federico Bella | Politecnico di Torino, Italy

Lithium batteries are at the heart of the global energy transition, but how far can today's technologies really take us? This lecture will explore the rapidly evolving landscape of lithium-based energy storage, connecting scientific breakthroughs with industrial competition, geopolitical challenges, and sustainability ambitions. Starting from the current technological state of the art, we will compare the European battery ecosystem with the strategies and achievements of major global players, highlighting opportunities and critical vulnerabilities along the battery value chain. Particular attention will be devoted to the materials science innovations that could redefine the next generations of batteries: high-energy cathodes, silicon-rich anodes, advanced electrolytes, solid-state architectures, and innovative interfacial engineering strategies. Beyond energy density, we will discuss the increasingly decisive roles of safety, resource availability, manufacturing scalability, and circularity. The lecture will ultimately address a fundamental question: which scientific breakthroughs are truly needed to shape the future of electrochemical energy storage?