

# CHEMICAL ENGINEERING

## DISAT - Water-based production of high energy lithium-ion cells

<b>Funded By</b>	Dipartimento DISAT
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<b>Contact</b>	
<b>Context of the research activity</b>	<p>The research of this PhD will be based on the study of processes for the sustainable production of Lithium ion cells with high energy density. It will therefore be necessary to study and optimize the production processes with the use of sustainable and innovative binders fitting with water-based production.</p>
<b>Objectives</b>	<p>The production of lithium-based cells is a topic of fundamental importance in Europe and there are 38 gigafactories in the project, some of which are also in Italy.</p> <p>The sustainable production of batteries is the basis of the storage of energy from renewable sources and of enabling the use of electric cars in the perspective of the energy transition which has been accelerated by the National Plan for Recovery and Resilience PNRR and provides for research activities of importance strategic right on the batteries.</p> <p>It is therefore essential to study the best production methods to create cells with proper energy density tailored for the final application.</p> <p>According to European indications and in particular the innovations coming from Battery2030 coordinated supporting action, project of European importance (<a href="https://battery2030.eu/">https://battery2030.eu/</a>), the European battery cell has to be fully sustainable from the choice of materials to its production and final recycling. For this reason, the research of this PhD will be based on the study of processes for the production of cells with high energy density, good cycling performance and without the use of cobalt, which is a critical raw material.</p> <p>It will therefore be necessary to study and optimize the production processes with the use of sustainable and water-based materials. A particular focus will be in the mixing aspects of slurries production with modeling and experimental activities.</p> <p>For an accurate characterization of the cells, a period abroad is foreseen at the CIC Energigune in Spain.</p> <p>These cells, produced during the research project in Politecnico of Torino, will be fully tested both to determine their performance and for safety aspects.</p>
<b>Skills and competencies for the</b>	<p>The candidate must have proven skills in the chemical and production of new materials as well as, possibly, experience in electrochemical characterization procedures. In addition, the candidate must demonstrate adaptability in both</p>

**development of the activity** academic and industrial research and a good knowledge of the English language