TEESMAT

Open Innovation Test Bed for Electrochemical Energy Storage Materials

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INTRODUCTION

Desired needs for future batteries:

- fast-charging capability
- long life-time
- high energy densities
- high safety

How to achieve improvements:

- Understanding of mechanisms
- Advanced Methods for Material Characterization

THE TEESMAT APPROACH

The TEESMAT project leverages European strengths from 11 countries and provides industrial access to physical facilities, capabilities, and services implementing **30 innovative novel physicochemical characterization solutions** with unprecedented capability & performance from a **Single Entry Point (SEP)**. The methods cover **in-situ** & **operando**, **post-mortem**, and **in-line production** characterization techniques. The techniques are subject to a continuous improvement throughout the project.

A **unique** and **innovative** one-stop-shop **problem solving** for supporting batteries innovation

FULL LIST OF TECHNIQUES

T1 – Operando Nuclear Magnetic Resonance
T2 – Glow Discharge Optical Emission Spectroscopy**
T3 – X-Ray Scanning Nano Spectroscopy
T4 – ToF-SIMS coupled to FIB Preparation
T5 – Operando electrochemical assessment of electrodes*
T6 – In Situ Optical Microscopy
T7 – Cell 3D Imaging by X-Ray Microtomography
T8 – X-Ray Micro & Nano Tomography
T9 – X-Ray Bragg Diffraction Microscopy
T10 – Operando X-Ray Diffraction
T11 – Coherent X-ray Diffraction Imaging
T12 – Acoustic Measurement
T13 – Hard X-Ray Total Scattering
T14 – Small Angle Neutron and Hard X-Rays Scattering
T15 – Nano-Characterisation Correlative Analyses
T16 – In Situ Electrochemical Raman Spectroscopy
T17 – Incremental Capacity Analysis
T18 – Electrochemical Impedance Spectroscopy
T19 – In Situ Spectrometry for gas analysis
T20 – Accelerated degradation cell test
T21 – Heat Flux Measurement
T22 – Differential Scanning Calorimetry
T23 – Blast Box and ARC
T24 – Operando Multi-Physics 3D mapping
T25 – Electrical Cycling with Sensors
T26 – In Line Electrode Material Production Control
T27 – Optical Quality Control
T28 – Quality Control of Coatings & Deposited Layers
T29 – Precision Coulombic Efficiency Test
T30 – Electron Paramagnetic Resonance Spectroscopy

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THE COMMUNITY!

TEESMAT aims at building up a strong EU community, to create a market for the delivery of advanced materials characterisation techniques. We will act as a portal for information, news and services based on TEESMAT battery materials characterisation techniques.

CONCLUSIONS

- Pan-European platform for characterization of energy materials.
- Method development covers industry needs
- Ex-situ and operando methods

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