

# Deliverable D3.2

## Report on NMC-sulphide cathode by wet processing – public summary

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## Public summary

Electromobility is one of the main concerns included in the EU community research programme in recent years. In this regard, the European Council endorsed in December 2019 the reduction of CO<sub>2</sub> emissions from light commercial vehicles by 31% between 2021-2030. Huge efforts have been made on the technological development and optimization of the lithium-ion battery (LIB) since its commercialization in 1991. However, the potential for further optimization of liquid electrolyte-based LIB is diminishing and the limits of this technology are expected to be reached within the coming decade. Therefore, alternative or next generation technologies need to be developed, and a new generation of so-called solid-state batteries (SSB) is under development. Nevertheless, the manufacturing of SSBs is still under research & development phase, and to reach to the Europe's objective to have 30 million electric vehicles (EV) by 2030, a large scale, in-house productions of highly effective and performant batteries is required.

In this regard, PULSELiON project aims to develop the manufacturing process of Generation 4b SSBs based on lithium-metal anode, sulfide solid electrolyte and Ni-rich NMC cathode. A novel pulsed laser deposition (PLD) technique will be adapted and modified into a single-step vacuum process for safe and efficient manufacturing of anode components. But before going deeper in processing of SSBs, it is necessary to optimize and validate at lab-scale the sulfide-based NMC cathode electrode made based on conventional wet processing techniques.

The deliverable D3.2 is the outcome of Task 3.2 within the work-package 3. In this task, the main purpose was to prepare the sulfide-based NMC cathode electrode by wet processing where electrode formulations were studied under different carbon, NMC active material, sulfide and polymer binder ratio as well as on the post processing parameters, after studying the compatibility of the non-polar solvent with the sulfide solid electrolyte and polymer binder. Wet-manufactured NMC cathodes of a loading of 1.5 mAh·cm<sup>-2</sup> displayed promising electrochemical results on Li metal sulfide-based full cells, laying the background for the upscaling of NMC cathode at large scale and the good progress of the PULSELiON project.