

Solid state sulfide Based LI-Metal batteries for EV applications

Deliverable 3.1 Report on delivery of 100 g sulfide for WP4

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Publishable summary

In the frame of the WP3 for materials optimisation and scaling up, two batches of circa 100 g of sulfide solid electrolyte have been synthesized by mechanochemical milling on a small pilot-scale equipment available at CEA with the following references, starting compositions and states:

- GEN-I material: 80 mol. % Li_2S – 20 mol. % P_2S_5 , glass-ceramic

- GEN-II material: 75 mol. % Li_2S – 25 mol. % P_2S_5 , glass-ceramic

The purposes of GEN-I material are to reach the target of a ionic conductivity value above 1 mS/cm at room temperature defined for the high energy density system (aka primary pathway), together with an availability before end of the first year of the project. The additional purpose of GEN-II material is to reduce the risk of hazard in handling. This hazard risk reduction has been driven by the known result that the Li_3PS_4 stoichiometric composition generates less H_2S in contact with humidity, but has led to a 33 % reduction of the ionic conductivity value from the one of GEN-I.

These batches have been dispatched on the first week of December 2020 (month 8) to partners of WP4 (CIC, AIT, IST, SAFT) with respective quantities of 20 and 30 g for GEN-I and GEN-II. Few grams have also been sent to Solvay to serve as reference versus GEN-III materials.