in AM4BAT Project





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2

AM4BAT will develop innovative component materials and assemble an **anode-free all-solid-state battery** (ASSB) manufactured by a costcompetitive and sustainable Vat Photopolymerization 3D printing. The objective is to reach a high-performance cell energy density of 400 Wh/kg and 1000 Wh/L for electric vehicles applications. This will be achieved by developing materials including i) single crystal NMC811 with superior energy, ii) **LNMO Co-free** and higher voltage for a high power AM4BAT variant, iii) doped LLZO with different size from 0.5 to 5µm and 50-100 nm for higher loading in the HSE (Hybrid Solid Electrolyte), and iv) novel acrylic sustainable photocurable polymer containing nanocellulose additive. The materials will be optimized for their processing by additive manufacturing. AM4BAT will then validate the technology via 3-Ah pouch cells reaching TRL5, and will carry out an evaluation of manufacturability, a full sustainability assessment and a recycling study to support customers' uptake. Identified stakeholder groups as well as other research initiatives will be actively involved to ensure dissemination of AM4BAT results and broader users' acceptance. With its ambitious concept based on cutting-edge 3D printed ASSB and a strong consortium involving the whole value chain from material providers to an OEM, AM4BAT aims to overcome the remaining technological obstacles of the Gen 4b technology as specified in the work programme and accomplish the urgent shorter-term needs of the battery industry: to make Gen 4b batteries a viable technology beyond 2025. On longer term, the AM4BAT outcomes will contribute to the creation of a sustainable European battery manufacturing value chain helping the EU to succeed in the electric mobility roll-out and accelerate the energy transition.



Developments' Roadmap & Cell configuration

AM4:// Anode-free system Lithiophilic/nanostructured Current collector **Engagement with** LEITET MA Leclanché stakeholders Formulations VUB NACHANE STELLANTIS LEITET HSE Cathode composite AIT MEMORY PROTO-3 E Cell configuration 3 Ah cell PROTO-2 M40 PROTO-1 Single layer Coin cell M24 **Material development** M18 toseda > Polymer Printing Photocentric Vat Photopolymerisation LLZO Commercial Gen2 and 3 TORRECID by LCD screen LEITET (liquid electrolyte and graphite) > NMC811 LEITET G Anode HSE PROTO-3 Photocentric > Cathode composite LMNO 130um Cu foil **UCL** + 100% Wh L-1 10um G Anode +33% Wh kg-1 130um x5 Charging rate Electrolyte 64% Manufacturing Energy PROTO-1 PROTO-2 Separator Developments' Roadmap 15um 10 um Lithium foil 100 um HSE 5 um Cathode NMC811 110um 10 um Cathode NMC811 HSE 50 um 110 um HSE 5 um Al foil 16um Al foil 16um Cathode NMC811 160 um 160 um Cathode NMC811 Cathode NMC811 110um Cathode NMC811 110 um Al foil HSE 15um 16um Al foil Separator . 🖞 16um 👌 5 um

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3

Work distribution and Impact







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THANK YOU

