HORIZON-CL5-2021-D2-01-06: Sustainable, safe and efficient recycling processes (Batteries Partnership) – two partners sought for battery metals chemistry and making of lithium batteries

Summary

A consortium led by a UK company is working on new recycling chemistry for converting low value black mass into high quality raw materials for (NMC) batteries and other nickel-containing lithium batteries. Partners are sought in:

- manufacturing battery-active materials (such as NMC, especially metal carbonates as the base or raw materials)
- manufacturing lithium cells using metal compounds manufactured by the consortium partners). Type of cooperation: research under Horizon Europe CL 5.

Description

A UK spinout company has brought to market lead battery recycling, which reduces the carbon footprint by 85%; reduces the waste outputs by more than 90%; saves 4,000 MWh for every 10,000 tonnes of batteries processed; reduces costs by 10-20%; and improves energy density in secondary lead batteries by up to 40% (because the recycled lead oxide has a higher porosity and surface area than incumbent or primary materials).

As the above technology matured, the company has recently initiated a lithium battery recycling programme, and they have secured two major grants (one for discharging electric vehicle battery packs; and one for scaling up a physical – mechanical process for the separation of components post-shredding, i.e. dry separation). The company is currently rolling out recycling capacity across two UK sites and aim to process 1,000 tonnes of primary lithium batteries by end of 2022, and they are already collecting portable and electric vehicle battery packs for processing. A French company which has joined the consortium brings a novel carbon capture process which can be used to recycle metals from battery black mass. The French and UK companies aim to collaborate to expand their respective recycling operations across the EU for the benefit of the European battery supply chain and to help meet and exceed applicable Directives.

The company is now in the process of putting together a major consortium for funding under the Horizon Europe framework. This new project focuses on use of a novel carbon capture process to capture metals from battery black mass and to recycle these metals. It represents a paradigm shift where carbon dioxide is used as a reagent, and the battery supply chain is further enhanced via high-quality secondary active material precursors. The project partners aim to capture carbon dioxide in the recycling processes, and to utilise and temporarily the caught carbon dioxide post-processing.

Three partners have already agreed to participate and a further two are being sought:

1. The consortium will produce “purified metal carbonates”, MCO3. They need a partner who has the capability to convert metal carbonates into battery-active materials for the lithium-ion battery industry. It is realised this technology may be early stage and will require piloting or scaling up.

2. The consortium will use the battery-active materials to manufacture lithium-ion cells. Ideally, they need a partner who can manufacture nickel/cobalt/manganese containing lithium batteries (the most interesting one would be lithium nickel manganese cobalt oxide (NMC), because they have a technology for recovering these common elements from primary Li batteries and nickel from Ni-MH batteries – the aim is to "lift" the metals from these low-value batteries and use the materials in next-generation NMC cells). A partner who has the capability to make other Ni containing cells (like lithium nickel oxide or Lithium Nickel Cobalt Aluminium Oxide) would also be acceptable, though NMC is preferred.

   The funding call is HORIZON-CL5-2021-D2-01-06: Sustainable, safe and efficient recycling processes (Batteries Partnership).

   Deadline of the call: 19 October. Deadline for responses: 31 August. Duration of the project is planned for 2 years.

Stage of development

Concept stage

Partner sought

Industry and academia are invited to respond in two fields:

- manufacturing battery-active materials (such as NMC, especially partners who can manufacture battery-active materials using metal carbonates as the base or raw materials)
- manufacturing lithium cells using the battery-active materials (i.e. to validate a lithium battery with the recycled metal compounds manufactured by the consortium partners).