Expression of interest

Contact details

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Short description of the organisation

Our team has the necessary technical infrastructure for the recovery, characterization and integration of active materials used in waste Li-ion batteries into a new electrochemical energy storage system. Our laboratories have leaching equipments, microwave-assisted leaching, electrical ovens, furnace for high temperatures, atmosphere controlled tube furnace, coin cell pressing machine, thin film making machine (doctor blade technics), glove box, potentiostat/galvanostats, X-ray diffraction spectrometer, field emission scanning electron microscopes, atomic absorption spectrometer, porosimetry, gas adsorption machine, thermogravimetric analyses machines, FT-IR spectrometer, Raman spectrometer, mastersizer.

Assoc. Prof. Dr. Metin GENÇTEN: Dr. Metin GENÇTEN has lots of studies about different types of energy storage systems such as Li/Na-ion batteries, supercapacitors, lead acid batteries, redox flow batteries. He has significant experience in electrochemical tests. He also has significant knowledge about hydrometallurgy. Currently, he continues to work on the producing of novel materials

technologies for energy storage systems and also recycling active materials of spent Li-ion battery.

Assist. Prof. Dr. Burak BİROL: Dr. Burak BİROL works on the recycling active materials of Li-ion batteries, different type of the furnace dusts, rare earth elements from different spent or waste sources. His studies on sustainability have made significant contributions to the literature. He will provide significant benefits to the project, especially in terms of recycling. He also expert on extractive metallurgy, pyrometallurgy and hydrometallurgy.

Res. Asst. Sezgin YAŞA: He has significant knowledge and experience in the recycling of li-ion batteries, precipitation of compounds, the use of recycled compounds as supercapacitor electrode materials and electrochemical tests. Also he has lots of experience on the fabrication of coin cell type energy storage systems.

Specific skills related to the call topic(s) or project

HORIZON-CL5-2024-D2-01-01: Advanced sustainable and safe pre-processing technologies for End-of-Life (EoL) battery recycling (Batt4EU Partnership)

In recent times, we have focused on the recovery of valuable materials from spent Li-ion batteries and on the use of the obtained compounds in a new energy storage system. In our laboratory, we have the necessary facilities for both the recycling of Li-ion batteries and the recovery of active materials. Also, we can provide the reuse of recycled compounds as supercapacitors or li-ion batteries. Our group has a lot of experience, especially in the construction of coin cell type energy storage systems. Additionally, different types of energy storage systems can be fabricated.

Proposed activities for the project or the call topic(s)
Indicate which activities you would like to implement during the project

Our working group has the ability and experience to take part in any stage of the work to be carried out on the project subject for which the call has been made. We can carry out recycling of Li-ion batteries by different techniques like hydrometallurgy or pyrometallurgy. In case of any need, we can contribute to an innovative study for

the recycling of Li-ion batteries. As we can contribute to recycling, we can also take part in every stage of the construction of a new energy storage system and the implementation of electrochemical tests.

References

Previous research project

Project acronym / starting date/ Article	Main objectives	Main activities	Role in the project
Project Obtaining Cobalt Oxide from Waste Li-ion Batteries and Examining the Use of This Substance as Electrode Material in Supercapacitors **/** 12.07.2023	Recycling of Co from $LiCoO_2$ cathode materials of li-ion battery and use of it in a new energy storage system.	Recycling of Co from $LiCoO_2$ cathode materials of Li-ion battery and precipitation of it as $Co(OH)_2$. Conversion of $Co(OH)_2$ to CO_3O_4 and use of $Co(OH)_2$ and CO_3O_4 compounds as supercapacitors electrode materials	All processes starting from hydrometallurgical leaching to the final supercapacitor production and electrochemical tests. - Leaching of cathode electrode material $LiCoO_2$ - Precipitation of cobalt in the form of $Co(OH)_2$ - Calcination of $Co(OH)_2$ to produce Co_3O_4 - Fabrication of coin cell type asymmetric supercapacitor by using $Co(OH)_2$ and Co_3O_4 as cathode materials - Electrochemicalte st of produced supercapacitors.

Article/Published Recovery of Cobalt as CoS from Spent Li-ion Batteries and Investigation of Its Use as Electrode Material of Supercapacitor	Recycling of Co from $LiCoO_2$ cathode materials of Li-ion battery and use of it in a new energy storage system.	Recycling of Co from $LiCoO_2$ cathode materials of Li-ion battery and precipitation of it as CoS. use of this compounds as supercapacitors electrode materials	All processes starting from hydrometallurgical leaching to the final supercapacitor production and electrochemical tests - Leaching of cathode electrode material $LiCoO_2$ - Precipitation of cobalt in the form of CoS - Fabrication of coin cell type asymmetric supercapacitor by using CoS as cathode materials - Electrochemicalte st of produced supercapacitors.
Article/ Published Recycling Valuable Materials from the Cathodes of Spent Lithium-Ion Batteries: A Comprehensive Re view	Recycling Valuable Materials from the Cathodes of Spent Lithium-Ion Batteries	A general investigation has been made of the recent studies on the recycling of li-ion batteries.	A general investigation has been made of the recent studies on the recycling of li-ion batteries.

Article/Submitted Recovery of Cobalt as Co(OH)2 and Co3O4 from Spent Li-ion Batteries and Its Use as Electrode Material for Supercapacitor	Recycling of Co from $LiCoO_2$ cathode materials of li-ion battery and use of it in a new energy storage system.	Recycling of Co from $LiCoO_2$ cathode materials of Li-ion battery and precipitation of it as $Co(OH)_2$. Conversion of $Co(OH)_2$ to CO_3O_4 and use of $Co(OH)_2$ and CO_3O_4 compounds as supercapacitors electrode materials	All processes starting from hydrometallurgical leaching to the final supercapacitor production and electrochemical tests. - Leaching of cathode electrode material $LiCoO_2$ - Precipitation of cobalt in the form of $Co(OH)_2$ - Calcination of $Co(OH)_2$ to produce Co_3O_4 - Fabrication of coin cell type asymmetric supercapacitor by using $Co(OH)_2$ and Co_3O_4 as cathode materials - Electrochemical test of produced supercapacitors.
Article/Published Production of ZnS based supercapacitor electrode material from ferrochrome ash waste	ZnS recovery from ferrochrome ash (FCA) waste using a hydrometallurgical process and use of it in a new energy storage system.	Recycling of ferrochrome ash (FCA) by using acids solution and precipitation of Zn from liquid solution as ZnS. The use of produced ZnS as a electrode material for the supercapaictor device.	- Leaching of FCA - Recovery of ZnS - Preparation of electrodes and asymmetric-type supercapacitors - Electrochemical test of produced supercapacitors.