# Project Partner Search Form

[x]  I offer my expertise to participate as a Partner in a Horizon Europe Project

[ ]  I am planning to coordinate a project and I am looking for Project Partners

**TOPICS OF INTEREST**

[TOPIC ID: HORIZON-CL5-2024-D2-01-01: Advanced sustainable and safe pre-processing technologies for End-of-Life (EoL) battery recycling (Batt4EU Partnership)](https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-cl5-2024-d2-01-01)

**PARTNER INFORMATION**

[The Institute of Recycling Technologies of the Faculty of Materials, Metallurgy and Recycling, Technical University of Košice](https://urt.fmmr.tuke.sk/index.php?hm=ustav&sm=aktuality&lang=eng) has been dealing with lithium-ion battery recycling since 2010. Since then, the Institute has solved domestic and international projects of batteries recycling from electric cars and electronics (notebooks, mobile phones) and published several publications and book chapters. The Institute has broad experiences in experimental work (TRL1-4) and it is capable to perform the demonstration tests (TRL 5) in recycling of spent batteries and other metal-bearing wastes.

**What we can offer in the project:**

* Research activities in discharging of spent batteries,
* The study of mechanical and physical pretreatment of waste (TRL 3-4):
	+ crushing, milling,
	+ separation methods,
	+ recovery of active mass and electrode materials,
* Thermodynamical and experimental study of hydrometallurgical processes (TRL 1-5):
	+ leaching of active mass or waste (TRL 1-5),
	+ leaching of slags after pyrometallurgical treatment of batteries (TRL 1-5),
	+ solution refining (precipitation, cementation, evaporation-crystallization) (TRL 1-5),
	+ ion exchange, solvent extraction, electrochemical methods (TRL 1-3),
	+ recovery of intermediate products or products based on lithium, cobalt and other metals (TRL 1-5).
* Analytical servis – XRD, XRF and AAS measurements.

**Description of the Legal Entity**

The Institute of Recycling Technologies of the Faculty of Materials, Metallurgy and Recycling Technical University of Košice specializes in the material recycling of wastes via mechanical and physical pretreatment, hydrometallurgical and pyrometallurgical processing. **The Institute has more than 20 years of experience in waste processing and recycling through international or national projects as well as direct cooperation with university and industrial partners.** The Institute focuses on the recycling both of municipal waste as well as industrial waste. In the field of municipal waste, Institute has exceptional knowledge in material recycling of spent batteries (e.g. lithium batteries from cars and electronics, spent portable batteries), waste of electrical and electronic equipment (mobile phones, computers, displays, photovoltaics etc.) and other waste. From the industrial sphere, it has deep experiences in recovery of valuables from metal-containing waste, such as drosses and sludges from aluminum production, waste from zinc and tin galvanizing, slag and dusts from copper, iron and steel production and other waste containing metals. Research & Development investigation is carried out in several specialized laboratories such as Centre of Waste Processing and Laboratory of Industrial Waste Treatment. The Institute is equipped with laboratory and large-scale equipment (TRL 1 – TRL 5) as well as analytical devices for elemental and phase analyses. For a full list of technical equipment, please visit: <https://urt.fmmr.tuke.sk/inc_files/katalog_zariadeni/tech_eqp.pdf>.

**Related Projects:**

* [**UNIVNET**](https://en.univnet.sk/) – University and Industrial Research and Educational Platform of the Recycling Society, Research on battery recycling, 2020 – 2022.
* [**Recovery of products from lithium-ion battery recycling**](https://urt.fmmr.tuke.sk/index.php?hm=veda&sm=vega0678&lang=eng), Scientific Grant Agency of the Ministry of Education, science, research and sport of the Slovak Republic and the Slovak Academy of Sciences, 1/0678/23, 2023 – 2025.
* [**Material recycling of lithium accumulators**](https://urt.fmmr.tuke.sk/index.php?hm=veda&sm=vega0556&lang=eng), Scientific Grant Agency of the Ministry of Education, science, research and sport of the Slovak Republic and the Slovak Academy of Sciences, 1/0556/20, 2020 – 2022.
* **Solutions for lithium ion battery waste** – development and optimization of progressive metallurgical method, Deutscher Akademischer Austauschdienst and The Ministry of Education, Science, Research and Sport of the Slovak Republic, 2019 – 2020.
* [**ReCoMet**](https://www.ants.rwth-aachen.de/cms/IAR/Forschung/Abgeschlossene-Forschungsprojekte/~mdtb/ReCoMet-Research-Cooperation-Metal-Rec/?lidx=1) – Research Cooperation Metal Recycling, funded by BMBF (Federal Ministery of Education and Research) call within the framework of the Federal Government’s Strategy for the Internationalization of Science and Research in the funding program “Establishment and Expansion of Joint Research Structures in Europe”, 2015 – 2017.

(also link: <https://urt.fmmr.tuke.sk/index.php?hm=veda&sm=recomet&lang=eng>)

**HORIZON project experience:**

* [CHROMIC project](http://www.chromic.eu/): Efficient mineral processing and Hydrometallurgical Recovery of by-product Metals from low-grade metal containing secondary raw materials

[x]  Higher Education [ ]  Research Institution [ ]  Public Administration

[ ]  Industry /SME [ ]  NGO [ ]  Other: ***Please specify***

**Description of the (Research) Team**

**Prof. Andrea Miškufová, PhD.** ([https://orcid.org/0000-0003-3868-210X](https://www.scopus.com/redirect.uri?url=https://orcid.org/0000-0003-3868-210X&authorId=8233532500&origin=AuthorProfile&orcId=0000-0003-3868-210X&category=orcidLink))specializes in the recycling of industrial and municipal waste, such as slags and dusts from aluminum, steel, and copper production (Cr, V, Zn, Al, Sn, Cu), waste from electrical and electronic equipment (recovery of critical rare elements from magnets, displays, lighting), spent Li batteries, and photovoltaic panels using hydrometallurgical or combined processes.

**Assoc. Prof. Pavol Liptai, PhD.** (<https://orcid.org/0000-0001-8197-6627>) focuses his scientific research on recycling technologies, mechanical and physical treatment of materials and waste, qualitative-quantitative analysis of the chemical composition of materials, objectification, measurement, and evaluation of physical environmental factors, as well as experimental product development using recycled materials.

**Ing. Zita Takacova, PhD.** (<https://orcid.org/0000-0003-4647-3308>) participates in research and development in the field of waste processing and recycling, primarily focusing on wastes containing metals, such as spent batteries and accumulators, WEEE, and various types of industrial waste.

**Ing. Jakub Klimko, PhD.** (<https://orcid.org/0000-0002-5369-4283>) is a young researcher who focuses on the mechanical-physical pretreatment of waste and hydrometallurgical methods of waste treatment, including leaching, refining of solutions, and recovery of metals from solutions. He has experience in treating waste from electrical and electronic equipment, used lithium batteries, and industrial waste containing zinc, tin, copper, and others.

**Expertise of the Team Leader**

**Assoc. Prof. Dusan Orac, PhD.** (<https://orcid.org/0000-0003-0392-8544>) is the Director of the Institute and an associate professor at the Institute of Recycling Technologies, Faculty of Materials, Metallurgy, and Recycling, Technical University of Košice. His expertise lies in the processing of various industrial and municipal wastes, including slags and dusts from steel and copper production, waste from electrical and electronic equipment, and batteries from electronic devices and electric/hybrid vehicles, etc. He specializes in the recovery of valuable metals such as zinc, copper, tin, lithium, cobalt, gold, and silver from these waste materials using mechanical and hydrometallurgical processes. He has experiences as a principal investigator in national grants projects and as researcher in the HORIZON project and the ReCoMet project (Federal Ministry of Education and Research, Germany).

**Potential role in the project**

[x]  Research [x]  Training

[ ]  Dissemination [x]  Other: **Verifying or demonstration of the intended technology on scale TRL 5 (hydrometallurgy), analytical servis**

e.g. project leader, scientific coordinator, workpackage leader, product development expertise.

Already experience as a Coordinator [ ]  YES [x]  NO

 Partner [x]  YES [ ]  NO

 Expert Evaluator [ ]  YES [x]  NO

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