





Mineral and Energy Economy Research Institute Polish Academy of Sciences

VII International Conference



Natalia GENEROWICZ*, Fernando TORNOS**

iTARG3T project as an example of development of Sn-W-Ta-(Li) recovery from secondary sources and sustainable mining from primary sources

One of the wealthiest tungsten-tin-(tantalum-lithium) mineral belts worldwide is located in western and central-eastern Europe, where different types of mineralization are related to highly evolved peraluminous granitic rocks. These ore deposits were intensely mined till the 1980's when the global crash of metal prices triggered the closure of most of the tin mines. More recently, market and political changes initiated the gradual reactivation of this mining sector and currently, there are several producing mines and tens of advanced exploration projects. However, most of these projects are brownfields and occur in or near already existing mine sites. This is partially caused by several issues that are specific for this type of mineralization. The deposits are usually low tonnage and mostly worked by SME's, they form irregular masses or narrow veins with difficult grade control, resource evaluation, and ore processing. Furthermore, the restricted geographic location, away from the major ore belts, and the price crisis have kept these deposits away from the recent advances of conceptual exploration. All of these problems have hampered greenfields exploration and advances in ore concentration and resource estimation.

The iTARG3T project aims to contribute significantly to the discovery and development of new sources of tin, tungsten, tantalum and lithium in Europe by improving exploration in technically challenging environments and developing mineral processing solutions.

The Mineral and Energy Economy Research Institute of Polish Academy of Sciences (MEERI PAS) as one of the project partners was responsible for collecting information and preparing reports on recycling and substitution of these elements and also report about environmental aspects of Sn-W-Ta-(Li). Analysis of metal availability showed that each of these elements can be recovered from various secondary sources. For example, tantalum can be recovered from more than 16 different sources such as end-of-life waste (e.g. capacitors) or municipal solid waste landfills containing electrical waste and electronic equipment - tantalum concentrations in such landfills are estimated to be around 1 mg/kg. Lithium is recovered mainly from lithium-ion batteries, where the lithium content in such batteries is about 6% relative to other metals. At present, the most commonly used methods for lithium recovery are hydro- and pyrometallurgical methods. Another report about environmental aspects of Sn-W-Ta-(Li) show that metal mining processes may cause changes in environment, freshwater availability, soil degradation and water pollution with severe consequences for human health and biodiversity. Due to the growing ecological awareness and care for the environment, entities involved in the extraction of Sn-W-Ta-(Li) are taking more and more actions to reduce the negative impact on the environment during their operations. To ensure the increasing demand for minerals in the following years, mining companies are using new digital tools such as multiscale modeling and simulation to develop environmentally sustainable processes. The challenge for mining companies, is to produce more minerals at lower cost, with lower impacts and the highest safety. There are many startups and companies such us, Eramet,

^{*} Mineral and Energy Economy Research Institute of the Polish Academy of Sciences, ngenerowicz@min-pan.krakow.pl ** Spanish National Research Council, Madrid.



VII International Conference Young Researchers' Innovative Ideas: Science | Start-Ups | Industry 27–28th of May 2021

EnergyX, Solvay, Lilac Solutions, Bacanora, POSCO and K-UTEC that strive to move the science forward and develop a novel extraction and process technologies for Sn-W-Ta-(Li).

Acknowledgements: This paper is support by EIT Raw Materials, iTARG3T (Innovative targeting & processing of W-Sn-Ta-Li ores: towards EU's self-supply) project, project number 18036.

ORGANIZERS









Mineral and Energy Economy Research Institute Polish Academy of Sciences

PARTNERS









ISBN 978-83-959215-9-9