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Legacy deposits: can a small-scale mining paradigm contribute to the re-processing mining wastes to supply critical raw materials?

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In line with the perspective of the Raw Material Initiative launched in 2008 by the European Commission to ensure access to and supply of critical raw materials in Europe, the H2020-funded IMPaCT project (Grant no. 730411) aims to develop a Switch-On Switch-Off (SO-SO) concept as an emergence of a new modern small-scale mining paradigm. Its ultimate goal is to increase the viability of many critical metals hosted in small primary deposits, particularly in Europe, by developing a modularized mobile plant (MMP) concept that can economically operate different type of ores in different types of geological and geographical contexts.

In addition, the project addresses the prospect of applying the SO-SO concept and the small-scale mining paradigm with regard to the reprocessing of mineral wastes in Europe. A dataset of legacy deposits of interest for the SO-SO concept was drawn from the ProMine Anthropogenic Concentration (AC) database (built during the European FP7 ProMine project) used as the data source and by applying a sequential-rating as a methodology to rank records and to highlight potential targets.

Apart from national mining wastes registries, the ProMine AC database remains so far the most exhaustive and reliable attempt at a consolidated pan-European database regarding mining wastes. Despite data shortcoming in the ProMine AC database, this study proposes potential targets of mineral wastes for the SO-SO concept in Europe and provides with preliminary information on location, type of waste, commodities content, tonnage and their potential.

To put into perspective the application of the SO-SO concept and the small-scale mining paradigm in regards with mineral wastes reprocessing, this study also proposes generic flowsheets to address specific potential targets identified among the records from the ProMine AC database and based on the preliminary information available. However, the relevancy and completeness of these information still require a case-by-case assessment. As a result, this methodology falls into a scoping approach that could be applied ahead of (pre)feasibility studies.

Combining the re-exploitation of a primary ore deposit along with the reprocessing of its wastes inherited from previous mining and ore processing activities is of great interest in seeking social acceptance. Eventually, in such perspective, a cross survey of the potential of both primary deposits, using the ProMine Mineral Deposits (MD) database, and secondary deposits, using the ProMine AC database, therefore appears as a relevant scoping strategy ahead of implementing

small-scale mining.