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Ionic liquids solutions for the recovery of valuable metals from acid mine drainage waters

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PURPOSE OF THE ABSTRACT

The fast development of the electronic industry has led to an ever-increasing global demand in metals and has played an important role in nowadays metal scarcity. Due to the mining rates practice in the past years, the average ore grade of most metals has decreased significantly. Furthermore, the environmental impact of mining activities far outlasts the operational lifetime of a mine. Poor management of the residues and wastes produced by mining activities, namely in the form of tailings, contributes to the creation of toxic and polluted abandoned areas of high impact on the environment and human health.

In line with the principles of a circular economy, the development of processes that allows not only the environment detoxification but also the recycling of waste streams for the recovery of valuable metals is of high relevance. In this work, ionic-liquid-based aqueous biphasic systems (IL-based ABS) were used as a more benign alternative to conventional liquid-liquid extraction processes in metals recovery from acid mine drainage waters from São Domingos mine, Portugal. Due to their ionic nature, the use of ILs allows metal extraction mechanisms that are not possible when conventional organic solvents are applied.[1] ABS composed of different ILs and Na_2SO_4 were evaluated for metals extraction in both metal standard aqueous solutions and real mine water samples. It was observed that ILs anion presents an important role in metals extraction. Furthermore, the potential use of conventional salts as additives in IL-based ABS, allowing the increase of the extraction efficiency and selectivity, was also demonstrated

FIGURES

FIGURE 1

FIGURE 2

KEYWORDS

aqueous biphasic systems | recycling | selective separation | circular economy

BIBLIOGRAPHY

[1] N. Schaeffer, H. Passos, I. Billard, N. Papaiconomou, J.A.P. Coutinho, Crit. Rev. Environ. Sci. Technol. 2018, DOI: 10.1080/10643389.2018.1477417.

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