

## **Possibilities of Using Eutectic Solvents in the Processing of Complex Minerals**

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### **Abstract:**

Raw materials are crucial for the global economy. They form a strong industrial base for the production of a wide range of goods and applications used in everyday life and modern technologies. Reliable and unlimited access to certain raw materials is raising increasing concerns worldwide. The global trend of using secondary raw materials and mining less balanced deposits of precious metals is also relevant in Slovakia. We have significant mining areas of copper and iron ores. The relatively high presence of noble metals, gold and silver, in polymetallic ores attracts investors from abroad. Currently, mining is ensured by high-quality technology, complications only arise when extracting noble metals from mineral complexes effectively. Pyrometallurgical processes are usually prevented by high antimony, arsenic and mercury content. During the pyrometallurgical process, dangerous volatile oxides of these toxic elements are formed, and their subsequent removal in the form of emissions is a financially demanding matter. The only viable way is the hydrometallurgical method. However, tetrahedrite is significantly resistant to most leaching agents, which complicates the entire process both technologically and economically. For this reason, new leaching options are being sought – new leaching agents that are more environmentally friendly and at the same time increase the yield of the given material. Interesting agents include ionic liquids and DES (Deep Eutectic Solutions). Eutectic solvents are an innovative group of substances that are gaining increasing attention due to their versatility, low toxicity and environmental friendliness. These solvents, which are formed by combining two or more components to form a eutectic point, have a wide range of applications from ecological chemistry to pharmaceutical and materials research. This work analyzes the properties of eutectic solvents in the extraction of critical elements from tetrahedrite deposits in Slovakia.

### **Keywords:**

Ores, Metallurgy, Leaching, Xrf Spectroscopy, Environmental Methods.