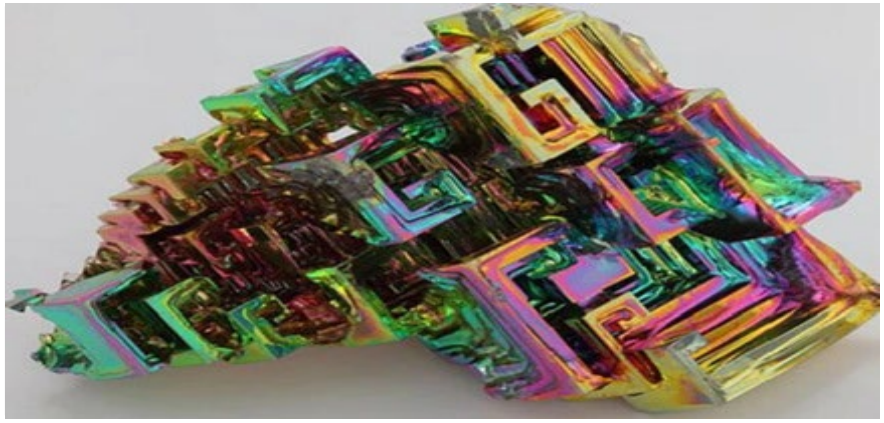
Technology Offer CSIC/IM/077

Recovery of added-value Bismuth from secondary sources during Copper production



Environmental and economically sustainable recovery of added-value Bismuth (Bi) raw material from the residues generated during the primary production of Copper with an integrated removal of the hazardous Arsenic present in them.

Intellectual Property

PCT patent application filed.

Intended Collaboration

Licensing and/or co-development.

Stage of Development

Pilot scale assays ongoing to achieve TRL=6.

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Market need

Critical Raw materials (CRM) are high economic impact raw materials in a wide range of industrial ecosystems that, due to the scarcity of local resources and external dependence, present high supply risk. Among them, Bismuth (Bi) is a non-toxic, eco-friendly metal broadly used in pharmaceuticals and cosmetics and as a fusible alloy to replace other harmful metals like lead. It presents a scarce end-of-life recycling rate (1%), highlighting the need for technological solutions based on secondary sources, to cover its growing demand.

CSIC solution

The copper smelter industry uses Copper (Cu) ore concentrate to obtain a high Cu quality (99,9%). During the process, different waste streams are formed, obtaining large amounts of by-products, including several critical raw materials, and waste elements.

A method is presented for the selective recovery and revalorisation of added-value Bi impurities from dust collected in the electrostatic precipitator (ESP) of the converter during the pyrometallurgical primary production of Cu. The ESP converter dust undergoes a physical-chemical process to separate the Bi as a value end-product and at the same time to eliminate hazardous arsenic (As) minimizing the environmental impact of this industrial activity.

Competitive advantages

- Added value to the Copper production process through Bi recovery from a waste stream, the ESP converter dust.
- Assurance of Bi supply (in its BiOCl form), critical for the EU economy.
- Reduction of environmental impact and waste management costs of industrial activities through the stabilization and disposal of As present in the residues.