

Analysis of water soluble metals in sulfide open-cast mines

M. Stylianou¹, S. Giannoukos², A. Agapiou³

¹Laboratory of Chemical Engineering and Engineering Sustainability, Faculty of Pure and Applied Sciences, Open University of Cyprus, Nicosia 2231, Cyprus

²Department of Chemistry and Applied Biosciences, ETH Zurich, HCI D 317, Vladimir-Prelog-Weg 3, CH-8093 Zürich, Switzerland

³Department of Chemistry, University of Cyprus, P.O. Box 20537, Nicosia, 1678, Cyprus

* E-mail: marinos.stylianou@ouc.ac.cy

Abstract

Abandoned sulfide mines in Cyprus are known to produce acid mine drainage (AMD), which is directly linked to potential environmental harm. New analytical techniques must be created and put into use immediately to find potential pollutants. In this work, a sampling campaign was performed to collect liquid samples from various mines in the Nicosia region. The samples came from various sites that were close to the mine crater, as well as from nearby pollution hotspots where liquid extracts could be obtained. An in house-built extraction electrospray ionization (EESI) source connected to a field-deployable high-resolution time-of-flight mass spectrometer (ToF-MS) was used to analyze the collected water soluble samples. A deeper knowledge of the fundamental mechanisms governing the release of water-soluble metals and their evolution in the environment, industry, or general public health will be possible thanks to the development of the EESI-ToF-MS. According to the findings, copper is the element with the highest concentration across all sites. The maximum values recorded across all locations exhibit a narrow range of 50-115 mg/m³. When compared to samples retrieved from craters, those taken directly from AMD showed higher amounts.

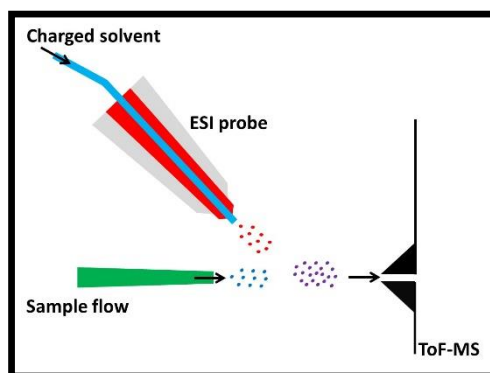


Figure 1: Schematic diagram of an EESI source coupled to a TOF-MS system.

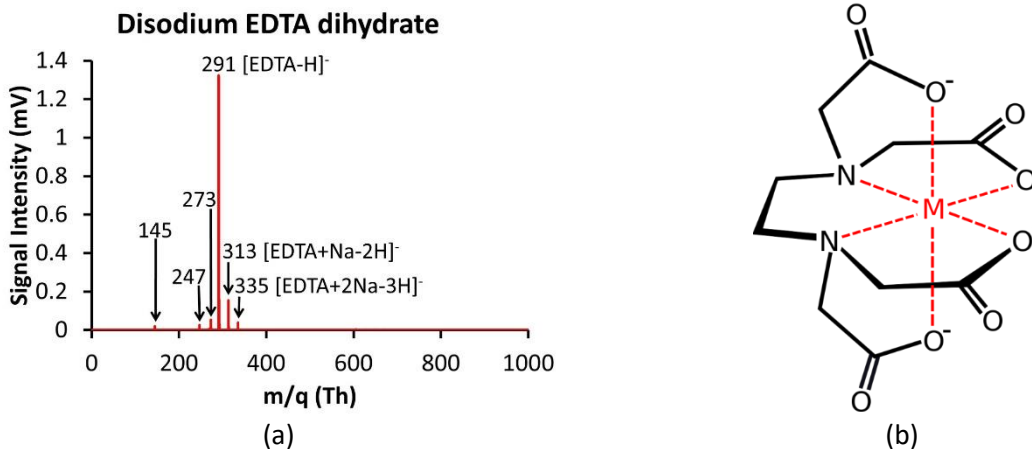


Figure 2: (a) Primary ions of the disodium EDTA dehydrate, (b) EDTA forms very stable chelate complexes with metal ions.

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