Nickel isotope signature in environmental samples from a vicinity of Ni-ore processing smelter analyzed by Thermal Ionization Mass Spectrometry

HANA ŠILLEROVÁ[1], VLADISLAV CHRASTNÝ[1]

[1] Dep. of Environmental Geosciences, Faculty of Environ. Sci., CULS Prague, Kamýcká 129, Praha 6, 16521, Czech Republic (*correspondence: sillerovah@fzp.czu.cz)

The objective of the study is to develope a methodology of nickel contamination tracing based on metal isotope analysis via TIMS (Thermal Ionization Mass Spectrometry).

The study area is located in the Barents region (Norwegian-Finnish-Russian border) where several nickel smelters and metal processing industries are located [1]. Environmental samples such as snow, lichens, mosses and soil profiles were collected, decomposed and firstly analysed for the metal content (ICP-MS). High levels of Ni were determined in all the types of samples (snow up to 3 mg/kg, lichens up to 220 mg/kg, mosses up to 90 mg/kg, soil organic horizons up to 500 mg/kg). The most significant is the contamination by Ni near the Nikel smelter and at the site located in the prevailing wind direction.

Subsequently the two step matrix separation was performed to eliminate potential non-spectral interferences [2]. The overall required recovery of metal separation from sample matrix was more than 95%. Several filament materials (Re, Ta, Pt) as well as several sample preparation techniques with addition of different reagents and additives were tested. Final mixture consists of about 1 ug of the high purity separated Ni in combination with silica gel, boric acid and Al, loaded on Re filaments. We prepared successfully the double spike solutions for Ni consisting of ^{61}Ni and ^{62}Ni enriched isotope standards. The calibration procedure includes natural standard analyses (CRM NIST 986) and pure double spike measurements. At the moment the analysis of the environmental samples is in progress.

[1] Kashulina et al. (2014) Atmos. Environ. **89**, 672-682. [2] Gueguen et al. (2013) Geostandard Newslett. **37**, 297-317.