Petrochemical typification of the oolitic iron ores from the Bakchar deposit (Westen Siberia)

E.M. ASOCHAKOVA

Tomsk State University, Russia, ev.asochakova@gmail.com

The Bakchar deposit is confined to the Upper Cretaceous and Paleogene deposits overlapped by a rather thick Neogene-Quaternary rock body (160-200 m). The iron ores are related with several horizons: Narymskian, Kolpashevskian, Tymskian and Bakcharskian. The depth of productive strata varies from 2 to 40 m. The iron ore horizons are traced throughout the entire area of the deposit, as well as outside its borders and are separated by the barren and weakly ferruginous rocks that overlap each other often with washouts.

While researching the ore horizon of the Polinyansk site, we classified the iron ore types, which differ from each other in structural characteristics, a mineral composition of the cementing mass, as well as in the specific locations of these types in the section. There are three main types of ores in the section structure. First type includes goethite-hydrogoethite (oolite) ore, which are brownish-yellow cemented or loose sediments. The second one is glauconite-chlorite; it has a firm weakly cemented composition and greenish-grey color. The third transitional type of ores has characteristics of both goethite-hydrogoethites and glauconite-chlorite formations.

In order to verify validity of ore type classification, we processed statistically all the data of the X-ray fluorescence analysis (Na_2O, MgO, Al_2O_3, SiO_2, P_2O_5, K_2O, CaO, TiO_2, MnO, Fe_2O_3tot) using the software “STATISTICA”.

The group clustered analysis using k-means clustering method allowed us to define one of three classes for each ore sample. The samples of ores are objects for clustering. The number of these classes was chosen according to the amount of ore types in the section described above. Clustering the samples of ore chemical compositions distinguishes clearly locations of different ore types in the ore horizon based on the change of chemical composition.

Using a factor analysis, two main factors were defined, which took more than 70 % of dispersion over. The components of the clastic part (SiO_2, K_2O, MgO, Al_2O_3) and the ore part (Fe_2O_3tot, P_2O_5 and L.O.I.) influenced the variation of chemical composition of the oolite iron ores significantly.

This study was funded by the Russian Ministry of Education and Science (projects 5.3143.2011, 14.B37.21.0686, 14.B37.21.1257).

Performance and gas-flow effects of an active 2-volume sampling chamber using a 213 nm laser ablation system for inductively coupled plasma-mass spectrometry

D ASOGAN[1]*, D. A. GREEN[1], S. SHUTTLEWORTH[2] AND J. W. ROY[2]

[1]CETAC Technologies, Omaha, NE 68144, USA (*correspondance: dasogan@cetac.com)
[2]Photon Machines Inc., Bozeman, MT 59715, USA

Laser ablation-ICP-MS technology has been rapidly improving for the past decade. The sampling chamber design of any laser ablation system is vital to ensure minimal elemental fractionation (by minimizing particle condensation/agglomeration), and enhance aerosol transport to improve accuracy, precision and sensitivity.

Improvements in sampling chambers design has led to higher spatial resolution and greater precision, which subsequently improves the quality of data in applications such as (bio-)imaging and geochronology respectively.

This paper discusses for the first time the use of an active 2-volume cell, which uses multiple gas flows to effectively transport laser aerosols for high spatial resolution (fast washout) and stability using a 213 nm laser ablation system. Performance characteristics are presented that highlight its versatility to multiple application types and also the importance of choosing the right gas flows for the particular ICP-MS system in use.

DOI:10.1180/minmag.2013.077.5.1