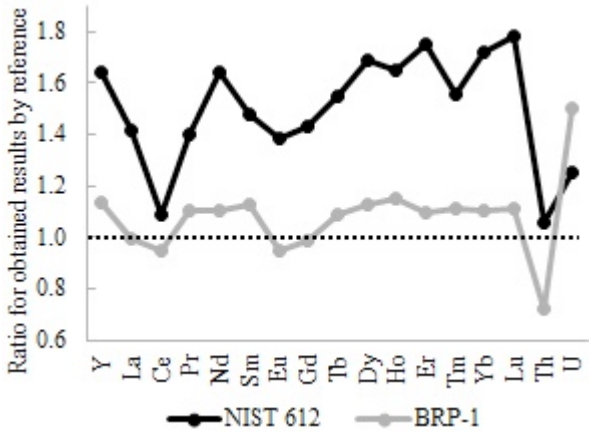
Determination of trace elements in iron formations by LA-ICP-MS

G.M.S. SAMPAIO[1], A.T. DE ABREU[1], H.A. NALINI JR[1]* AND C.C. LANA[1]

[1]Federal University of Ouro Preto, Ouro Preto, MG 35400-000, Brazil (*correspondence: nalini@degeo.ufop.br)

Introduction

Here we present a method to measure trace elements (Y, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Th and U) in banded iron formation. The samples (XRF fused beads) were abladed (spot and raster) in a Nd:YAG 213 nm New Wave Laser coupled to an Agilent 7700x ICP-MS. Internal standards ^{29}Si and ^{57}Fe from the certified reference BRP-1 (in fusion beeds) and the glass NIST SRM 612 were used to callibrate the unknows. We discuss our results based on repeated analyses of the reference material IF-G (GIT-IWG, France).



Results and discussion

The internal standards ^{29}Si and ^{57}Fe showed no statistical diference and proved be suitable for the intended use. Although the slight increase in the instrumental error, the raster pattern showed better mean results than the spot. The calibration with the glass SRM 612 showed a significative bias, as demonstrated in the Figure 1. The best results were obtained by calibration with BRP-1 reducing the matrix effect. Figure 1: Ratio between obtained results using NIST 612 and BRP-1 and values from IF-G certificate.

Aknowledgments

The authors thank the FAPEMIG and VALE that support this study through the project RDP-00063-10.

Microflora of native biofilm on activated carbon under filtration of fulvic acids

O. SAMSONI-TODOROVA*, N. KLYMENKO AND T. CHEKHOVSKAIA

Institute of Colloid Chemistry and Chemistry of Water, 42 Vernadsky Avenue, Kyiv, 03680, Ukraine (*correspondence: samsoni@online.ua)

Carbon filters long-term exploitation for drinking water treatment causes the inevitable formation of native biofilms on the surface of porous activated carbon (AC). The aim of this paper was to assess the quantitative and qualitative composition of biofilms microflora that formed spontaneously on AC KAU by filtering of fulvic acids (FC) model solutions in the different conditions. Initial composition of these solutions met Dnieper river water. Filtering time was more than 6 months.

Obtained results are shown in the table 1.

Samples	Microorganisms types and quantity, cells/gAC
AC with native biofilm that was formed by passing of FA solutions (pH 2) and hydrogen peroxide	Yeast; $2.0 \cdot 10^2$
AC with native biofilm that was formed by passing of FA solutions (pH 2)	Fungi, yeast; $6.0 \cdot 10^2$
AC with native biofilm that was formed by passing of FA solutions (pH 6) and hydrogen peroxide	Fungi, yeast; $3.5 \cdot 10^4$
AC with native biofilm that was formed by passing of ozonated FA solutions (pH 6)	Fungi, bacteria; $12.1 \cdot 10^4$

Table 1: The qualitative and quantitative composition of native biofilm microorganisms on AC after long-term filtering of FA solutions

Native biofilms were composed from yeast and fungi in the first two cases. This is due to the fact that filtered through charcoal FA solution had low pH, which is more acceptable for the activity of these microorganisms groups. In this case the quantity of microorganisms is lower than by neutral solutions filtering in two orders.

Quantity of live biofilm biomass was about 30% of the total biomass in the biofilm layers near the media and in the outer layers it was about 100%.

DOI:10.1180/minmag.2013.077.5.19