

OM and SEM-EDS were mainly used to identify various phases in the slag and ceramic. Leica DMLM optical microscope was used in plane polarized light to examine the crystalline phases, metallic prills and homogeneity of all polished samples. After optical examination, all samples were carbon coated. Philips XL30 scanning electron microscope equipped with Oxford Instrument energy dispersion spectrometer (EDS) was used with INCA software to obtain high quality back scatter electron (BSE) images and to semi-quantitatively determine the composition of individual phases and the bulk of samples. Bulk composition of slags and ceramic body of crucibles was detected by area analysis (1.2 mm × 0.9 mm). Six areas were randomly selected for each sample. Where the size of a sample was too small for six analyses, as many as possible area analyses were done to cover the whole sample. The analytical condition of SEM-EDS was set up as acceleration voltage 20 kV, spotsize 5.0, deadtime of the EDS ranging from 20%-35%, and beam current around 65 μA. Cobalt standard was analyzed every 30min to examine the stability of machine and make sure the total of our analyses close to 100%. A ZAF procedure was used to calculate the concentration of analyzed elements from measured counts in EDS detector.

Lead isotope ratios were measured with a multi-collector mass spectrometer with an inductively-coupled argon plasma as ion source. The samples were treated with concentrated aqua regia and lead was separated by ion exchange techniques. The mass fractionation within the instrument was corrected with thallium that was added to the sample solution. It was assumed that the fractionation follows an exponential law and a value of 2.3871 was used for  $^{205}\text{Tl}/^{203}\text{Tl}$  ratio. The interference of  $^{204}\text{Pb}$  and  $^{204}\text{Hg}$  was corrected by measurement of  $^{202}\text{Hg}$  with a ratio of  $^{204}\text{Hg}/^{202}\text{Hg} = 0.2293$ . The in-run precision of the measurements were between 0.02 and 0.05% ( $2\sigma$ ) depending on the isotope ratio considered.