

High Temperature Release-Recovery Pre-concentration Method of Mercury from Meteorites

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Abstract: In recent years, high precision mercury isotope analysis has been achieved with the application of Online Mercury Vapor Generation System coupled with the Multi-Collector Inductively Coupled Plasma Mass Spectrometry (MC-ICP-MS).. However, traditional digestion methods are not able to pre-concentrate mercury from meteorite samples with low mercury content in order to meet the requirement of mercury isotope analysis. The application of other effective methods for extracting and pre-concentrating mercury from meteorite samples is crucial to solve this problem. In this study, the method of heating the tubular muffle furnace can realize the effective preconcentration of mercury from meteorite samples, in order to complete the determination of the mercury isotope compositions of meteorites with low content of mercury. In addition, this new method can meet the requirement of mercury isotope measurement as it has relative high recovery of mercury from meteorite samples, with the recovery rate of $96.9\% \pm 6.6\%$ isotope measurement. Based on this method, we have discussed some key relevant issues, including the storage temperature ($<70\text{ }^{\circ}\text{C}$) and size of meteorite samples, in order to reduce their influences on the recovery of mercury from meteorite samples.

Keywords: mercury (Hg); meteorite; pre-concentration; isotope; measurement