



Lead Isotope Ratios Analysis in Corals by High Resolution ICP-MS

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A precise method for measuring the lead isotope ratios of Hainan corals (porites lutea) in China by high-resolution inductively coupled plasma mass spectrometry (HR-ICP-MS) is established. In this study, cleaning procedures suitable for corals shall include four steps, MQ water wash, 0.02mol/L HNO₃ wash, oxidation wash and then reduction wash, with a stabilized Pb/Ca value, as at 15nmol/mol. Then, matrix effect is minimized by separating Pb from Ca matrix in corals with anion exchange resin AG1-X8. Several eluents for eluting Pb from the resins, including 6mol/L HCl, 0.05mol/L HBr containing 0.5mol/L HNO₃, MQ water, as well as 0.5mol/L HNO₃ which was a brand new eluent for corals were compared, and 0.5mol/L HNO₃ was selected as the best eluent in this study of which the procedural blank was 18pg, the recovery of 208Pb, 207Pb and 206Pb was 99.8 [U+FF05], 100.4 [U+FF05] and 100.1 [U+FF05] respectively. While determining 207Pb/206Pb and 208Pb/206Pb of NIST 981 by HR-ICP-MS, external correction method was found as the best choice to correct mass bias comparing with only using thallium as an internal standard or external standard combined with internal standard, of which the long term accuracy error was $\leq 0.015\%$ and the relative standard deviation (RSD) was 0.04%-0.1% (n=5). With the appropriate cleaning procedure, enrichment methods and mass bias correction methods, the values obtained for 207Pb/206Pb and 208Pb/206Pb ratios in corals of this study was 0.8505 and 2.087 respectively, the RSD was better than 0.12% (n=21).