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A rapid determination method for Re and Os isotope compositions using MC-ICP-MS combined with sparging method

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We present a rapid determination method for Re and Os isotope compositions using MC-ICP-MS (NEPTUNE) combined with a sparging method. The sparging method allows us to measure Os isotope compositions just after acid sample digestion in a Carius tube without the most commonly used but time-consuming solvent extraction by using CCl₄ and HBr. Our NEPTUNE is equipped with the multi-ion counter (MIC) system, enabling simultaneous measurement of a maximum of four Os isotopes. Compared to negative thermal ionization mass spectrometry (N-TIMS) which is now the most widely used for Re-Os analyses, sample throughput becomes several times higher. Therefore, the Re and Os measurement of sedimentary rock samples by NEPTUNE combined with the sparging method is expected to be a powerful tool to reconstruct the secular change of the marine Os isotope compositions with high resolution, which possibly unravels the cause of paleo-ocean global environmental change. In this presentation, we introduce the developed analytical method of Re and Os isotopes and their geological application. The accuracy, reproducibility and Re-Os data of GSJ geochemical reference samples (JCh-1 and JMS-2) measured by NEPTUNE are also compared with those by N-TIMS.

Keywords: Re-Os isotope, MC-ICP-MS, NEPTUNE, sparging method, multi-ion counter (MIC)