

## High precision and high sensitive stable isotopic analysis by using original CF/DI-IRMS system for IsoPrime100

NAKANE, Masaharu<sup>1</sup> ; TANAKA, Takashi<sup>1</sup> ; TETSU, Tomomi<sup>1</sup> ; TAKAGI, Haruka<sup>2</sup> ; ISHIMURA, Toyoho<sup>1\*</sup>

<sup>1</sup>National Institute of Technology, Ibaraki College, <sup>2</sup>Waseda University

The stable carbon and oxygen isotopic compositions ( $\delta^{13}\text{C}$  and  $\delta^{18}\text{O}$ ) of calcium carbonate, especially biogenic calcite, are used for environmental analysis (e.g. reconstruction of paleo-seawater temperature). The measurement of  $\delta^{13}\text{C}$  and  $\delta^{18}\text{O}$  of calcium carbonate is performed based on the comparison between the  $\delta^{13}\text{C}$  and  $\delta^{18}\text{O}$  of international standard calcite. Through the analysis, the isotopic values of samples should be determined precisely in order to compare and discuss with the analytical results reported in previous studies. In this study, we have developed a sample preparation system for IRMS (isotope ratio mass spectrometer) for high precision and high sensitive analysis. As a result, analytical results of NBS-19 (international standard calcite) using the developed system with dual-inlet IsoPrime100 (IRMS) showed  $\delta^{13}\text{C} = +1.95 \pm 0.026 \text{‰}$  and  $\delta^{18}\text{O} = -2.20 \pm 0.056 \text{‰}$  in long-term external analytical precision (n=36). Moreover, we found that short-term external precision (within a day) for this system have achieved around  $\pm 0.01 \text{‰}$ . By using the developed system with continuous-flow IsoPrime100 (IRMS), we can determine  $\delta^{13}\text{C}$  and  $\delta^{18}\text{O}$  of calcite and seawater (as low as 0.1 microgram of  $\text{CaCO}_3$ ; 1 nmol of  $\text{CO}_2$ ) with standard deviations of  $\pm 0.1 \text{‰}$ .

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