

## Ocean tracer $^{236}\text{U}/^{238}\text{U}$ research using a new MC-ICPMS method

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A new MC-ICPMS (multi-collector inductively coupled plasma mass spectrometer) method has been developed to determine  $^{236}\text{U}/^{238}\text{U}$  atomic ratios in samples with only femtograms of  $^{236}\text{U}$  detected by a secondary electron multiplier (SEM) [1]. Only 0.1 g and 1 L of coral and seawater sample, respectively, are required to yield an estimated methodological detection limit of  $^{236}\text{U}/^{238}\text{U}$  atomic ratio as low as  $2 \times 10^{-10}$ . The throughput is as high as 3-4 samples per hour. Analytical accuracy is validated by reference materials with  $^{236}\text{U}/^{238}\text{U}$  ratios of  $10^{-7}$  to  $10^{-9}$ , including the IRMM-075 series, and two ETH Zurich in-house standards, ZUTRI, and natural surface seawater ZSW. Here, we used the new MC-ICPMS technique to determine  $^{236}\text{U}/^{238}\text{U}$  ratios in (1) small coral samples in a bimonthly to an annual resolution and (2) seawaters at different depth. The result provides potential applications on paleo ocean circulation and vertical mixing studies in the subtropical-tropical western Pacific.

[1] Lin, Chiang, Yu, Christl, Liu, DeLong, Shen (2021)  $^{236}\text{U}/^{238}\text{U}$  Analysis of Femtograms of  $^{236}\text{U}$  by MC-ICPMS. *Analytical Chemistry* 93, 8442-8449.