In-situ Sr isotope analysis of Cambro-Ordovician Carbonate by using new reference material

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In situ Sr isotope analysis by LA-MC-ICPMS (laser ablation multi-collector inductively coupled plasma mass spectrometer) has great potential for various geological research fields. This method has many advantages of high spatial resolution, rapid data collection, and simple preparation of sample compared to a conventional solution-based analysis. However, lack of matrix-matched reference material has been a difficulty. In this study, we suggest new reference materials (KRNC, UKC, DGC) and the result of in situ Sr isotope analysis of carbonate by using the new reference materials. The new reference materials are all natural calcite with 300-1,000ppm of Sr. Major and trace elements are analyzed by EDS and ICP-MS, and $^{87}Sr/^{86}Sr$ isotope ratio is analyzed by TIMS. Results of $^{87}Sr/^{86}Sr$ isotope ratio by LA-MC-ICPMS (Nu Plasma II combined with NWR193uc) matches well with the result from TIMS. As a result of analyzing Cambro-Ordovician Carbonate with the newly developed reference materials, it shows very high Sr isotope ratios, such as Calcite background (0.712603), Calcite vein (0.724717), Gab filling (0.720624), Clustered anhedral fine dolomite (0.742580), Clustered anhedral to subhedral coarse dolomite (0.717445), Dolomite background (0.717969), Floating anhedral to subhedral coarse dolomite (0.716057), Floating euhedral to subhedral coarse dolomite (0.717490), Floating euhedral to subhedral fine dolomite (0.722671) in average, unlike the bulk Sr isotope results in global trend at the same time. Also, the in-situ Sr isotope ratio results shows different trend based on micro-textural observation. Therefore, we suggest that in situ Sr isotope analysis could provide new geochemical information based on textural observation.