

Sr-chemostratigraphy using MC-ICP-MS investigations

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We developed set of analytical procedures of high-precision isotope analysis of strontium in carbonate and carbonate-containing rocks to solve Sr-chemostratigraphy problems based on the MC-ICP-MS method.

For the presented series of analyzes of the SRM 987 standard, the average value of the ⁸⁷Sr/⁸⁶Sr ratio was 0.710249. At the same time, the convergence of the results was achieved (or long-term reproducibility, $\pm 2SD$) at the level of ± 0.00010 , which in relative units is $\pm 0.0013\%$. The obtained value within the error coincides with the value accepted for this standard - $^{87}\text{Sr}/^{86}\text{Sr} = 0.710248 \pm 11$ [1].

Sample-monitor	Method	⁸⁷ Sr/ ⁸⁶ Sr	$\pm 2SD$
#1	TIMS	0.707347	0.000010
	MC-ICP-MS	0.707325	0.000014
#2	TIMS	0.707314	0.000010
	MC-ICP-MS	0.707296	0.000014
#3	TIMS	0.707908	0.000010
	MC-ICP-MS	0.707888	0.000014
#4	TIMS	0.708420	0.000010
	MC-ICP-MS	0.708411	0.000014
#5	TIMS	0.708451	0.000010
	MC-ICP-MS	0.708444	0.000014

Table 1. Comparison of the results of measuring the ⁸⁷Sr / ⁸⁶Sr ratio in limestone obtained by the 2 methods.

From the data given in Table 1, it can be seen that for all monitor samples there is a coincidence within the analytical errors of the measurement results of the ⁸⁷Sr / ⁸⁶Sr ratio obtained both using the TIMS method and the MC-ICP-MS method. Good consistency of the results of the analysis of monitor samples indicates that the developed set of analytical procedures allows us to obtain reliable data for carbonate rocks and, thus, successfully solve the problems of Sr-chemostratigraphy.

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[1] Thirlwall M.F. Chemical Geology. 1991. T94