

Supporting Information

Sensitive determination of neodymium isotope in seawater by multi-collector inductively coupled plasma mass spectrometry with ultrasound nebulization-dielectric barrier discharge vapor generation as sample introduction

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Sample pretreatment processes for Nd isotopic analysis in seawater

First, the entire extraction setup was cleaned with 5 mL of 1 mol L⁻¹ HNO₃ solution and 60 mL of Milli-Q water in turn. And the pH of the NOBIAS resin column was adjusted using 5 mL of 0.05 mol L⁻¹ NH₄Ac buffer solution. Then, 5 L of seawater sample was used and adjusted to pH of 4.65-4.75. Next, the seawater sample was passed through the NOBIAS resin column, where the rare earth elements were adsorbed on the resin. Then 0.05 mol L⁻¹ NH₄Ac buffer solution was used to remove the residual K⁺, Na⁺, Ca²⁺, Mg²⁺ and other impurity ions. Following, 1 mol L⁻¹ HNO₃ solution was used to elute the rare earth elements from the resin. Finally, the enriched rare earth element solution was passed through the LN-C50-A resin column to separate Nd from Sm. 13 mL of 0.25 mol L⁻¹ HCl solution was used as elution solution and the later 8 mL of effluent was used for Nd isotopic analysis. Before determination by MC-ICP-MS, the 8 mL of effluent was vaporized to 2 mL to further enrich the concentration of Nd.

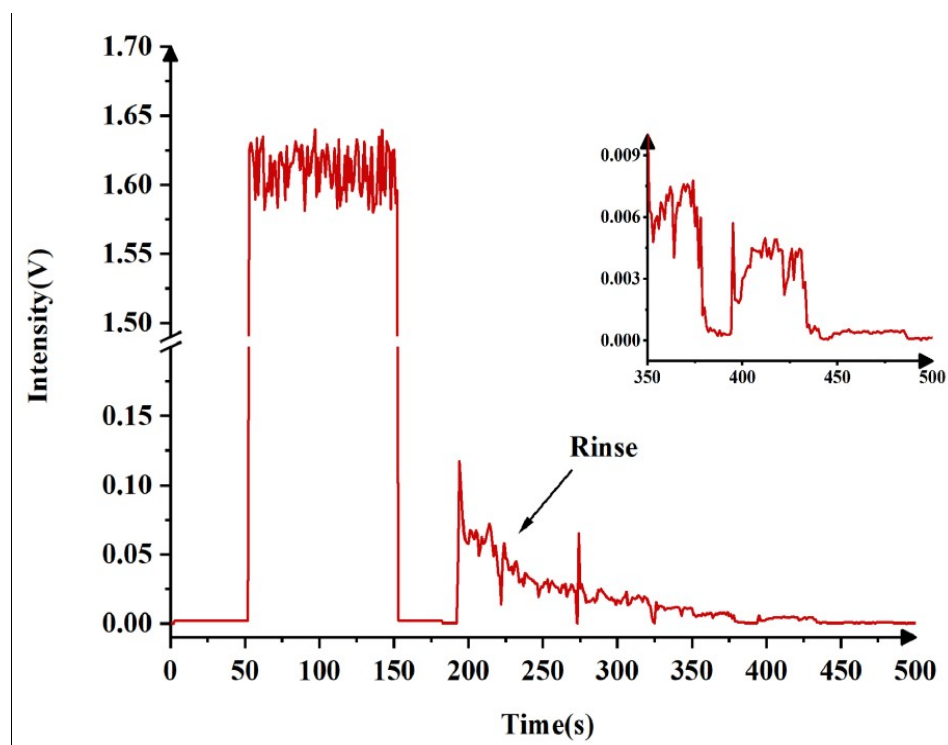


Fig. S1 The memory effect of ^{144}Nd ($10 \mu\text{g L}^{-1}$ Nd) by UNDBD sample introduction system. $600 \mu\text{L}$ of 2% (v/v) nitric acid blank is used for each rinse.

Table S1 Instrumental parameters of MC-ICP-MS for Nd isotopic analysis.

Parameters	Values
RF power	1150 W
Cool gas	16 L min ⁻¹
Auxiliary gas	0.8 L min ⁻¹
Sample gas	1.05 L min ⁻¹
Mass resolution	Low
Cycles/blocks	100 cycles/1 block
Sample/skimmer cones	Sample + 'H'
Integration time	1.049 s
Nebulizer	PFA microflow (100 μL min ⁻¹)
Aridus III Ar sweep gas	4.0-5.0 L min ⁻¹
Aridus III N ₂ gas	0.0 mL min ⁻¹
Aridus III spray chamber (heater/chiller)	140/110°C

Table S2 The results of Nd isotopic ratios in the feed solution and the waste solution in GLS measured by MC-ICP-MS with dry plasma mode.

Nd isotopic ratio	Feed solution	Waste solution	Bias ^a
¹⁴³ Nd/ ¹⁴⁴ Nd	0.507809±0.000023	0.503633±0.000043	8.2%

^aBias= (waste solution value / feed solution value) -1, n=5.