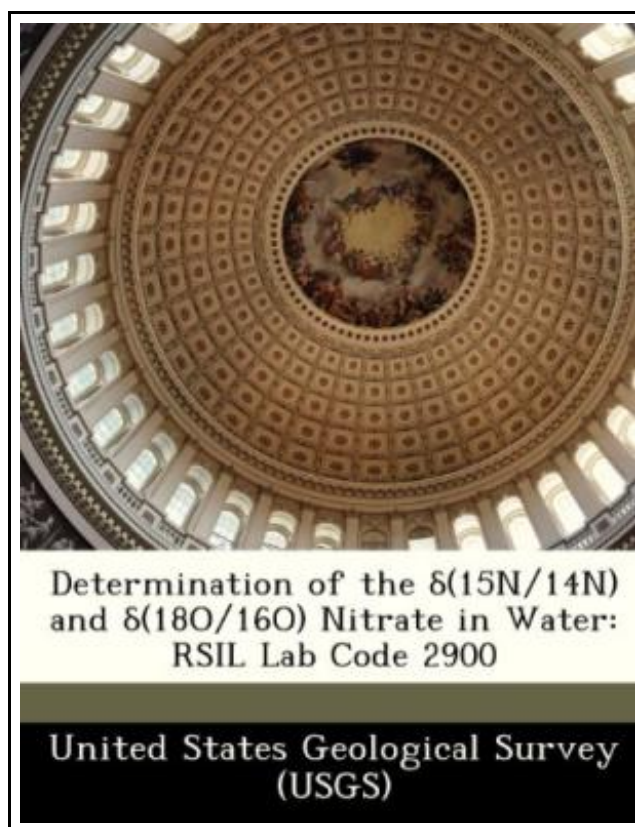


## Determination of the ( $^{15}\text{N}/^{14}\text{N}$ ) and ( $^{18}\text{O}/^{16}\text{O}$ ) Nitrate in Water: Rsil Lab Code 2900



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## DETERMINATION OF THE (15N14N) AND (18O16O) NITRATE IN WATER: RSIL LAB CODE 2900

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BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 38 pages. Dimensions: 9.7in. x 7.4in. x 0.1in. The purpose of Reston Stable Isotope Laboratory (RSIL) lab code 2900 is to determine the (15N14N), abbreviated as 15N, and (18O16O), abbreviated as 18O, of nitrate (NO<sub>3</sub><sup>-</sup>) in water. The 15N and 18N of dissolved NO<sub>3</sub><sup>-</sup> are analyzed by conversion of NO<sub>3</sub><sup>-</sup> to nitrous oxide (N<sub>2</sub>O), which serves as the analyte for mass spectrometry. A culture of denitrifying bacteria is used in the enzymatic conversion of NO<sub>3</sub><sup>-</sup> to N<sub>2</sub>O, which follows the pathway shown in equation 1. Because the bacteria *Pseudomonas aureofaciens* and *P. aureofaciens* lack N<sub>2</sub>O reductive activity, the reaction stops at N<sub>2</sub>O, unlike the typical denitrification reaction, that goes to N<sub>2</sub>. After several hours, the conversion is complete, and the N<sub>2</sub>O is extracted from the vial, separated from water vapor by Nafion drier and from CO<sub>2</sub> with a layered Mg(ClO<sub>4</sub>)<sub>2</sub>Ascarite trap, and trapped in a small-volume trap immersed in liquid nitrogen. After the N<sub>2</sub>O is released, it is further purified by gas chromatography (GC) before introduction to the isotope-ratio mass spectrometer (IRMS). The IRMS is a Finnigan DeltaPlus continuous flow isotope-ratio mass spectrometer (CF-IRMS). It has a universal triple collector, consisting of two wide cups with a narrow cup in the middle; it is capable of simultaneously measuring masscharge (m/z) of the N<sub>2</sub>O molecule 44, 45, and 46. The ion beams from these m/z values are as follows: m/z 44 N<sub>2</sub>O 14N14N16O; m/z 45 N<sub>2</sub>O 14N15N16O or 14N14N17O; m/z 46 N<sub>2</sub>O 14N14N18O. The 17O contributions to the m/z 44 and m/z 45 ion beams are accounted for before 15N values are reported. This item ships from La Vergne, TN. Paperback.



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