ISOLAB Scientific
Stable Isotope Analysis

Laboratory Standard IA-R078

IA-R078: ^{2}H & ^{18}O Water standard (High Enriched Water)

This laboratory standard is intended to provide a sample of known isotope composition with $^{2}H/^{1}H$ and $^{18}O/^{16}O$ isotope ratios stated in parts per thousand difference (‰) from the V-SMOW (Vienna Standard Mean Ocean Water) isotope ratio standard. This laboratory standard is not certified, but is provided to allow routine checking of the overall quality of measurements performed by continuous-flow isotope ratio mass spectrometry, and may be used as part of a quality control program. It is not intended for use as a substitute for calibration materials or inter-comparison materials distributed by NIST or IAEA.

Analysis

The $^{2}H/^{1}H$ and $^{18}O/^{16}O$ isotope ratios of the laboratory standard were measured by continuous-flow isotope ratio mass spectrometry using V-SMOW2 and SLAP2 (Standard Light Antarctic Precipitation 2) calibration materials and GRESP (Greenland Summit Precipitation, water) as an inter-comparison material. The laboratory standard and V-SMOW2, SLAP2 and GRESP were prepared for $^{2}H/^{1}H$ and $^{18}O/^{16}O$ isotope ratio analysis by equilibration with hydrogen (1) for $^{2}H/^{1}H$ and carbon dioxide (2) for $^{18}O/^{16}O$. Measurement of $^{2}H/^{1}H$ and $^{18}O/^{16}O$ isotope ratios in the laboratory standard was undertaken five times on three separate occasions.

(1) Iso-Analytical SOP No. 0216 - Preparation of liquids for H_2 Equilibration-CF-IRMS.
(2) Iso-Analytical SOP No. 0217 - Preparation of liquids for CO_2 Equilibration-CF-IRMS.

Isotope Abundance

V-SMOW is the isotope standard to which laboratory standard IA-R078 is compared. The $^{2}H/^{1}H$ and $^{18}O/^{16}O$ isotope ratio scales are defined in terms of V-SMOW and SLAP, such that the $^{2}H/^{1}H$ and $^{18}O/^{16}O$ isotope composition of SLAP relative to V-SMOW is –428 ‰ for ^{2}H and –55.5 ‰ for ^{18}O. The isotope composition of the laboratory standard in ‰ notation (relative to V-SMOW) can be found on the following page.

Nb. Although V-SMOW2 and SLAP2 were used for calibration, isotope values are still reported on the VSMOW/SLAP scale according to IAEA guidelines (20 June 2007).

Laboratory Standard	$\delta\ ^{2}H_{V\text{-}SMOW}$ (‰) $\delta_m \pm \sigma_1$	$\delta\ ^{18}O_{V\text{-}SMOW}$ (‰) $\delta_m \pm \sigma_1$
IA-R078	2051.96 ± 2.23	263.43 ± 0.59
(High Enriched Water)		

Note: $\delta_m = \sum_{i=1}^{n} \delta_i/n$; $\sigma_1 = \sqrt{\sum_{i=1}^{n} (\delta_m - \delta_i)^2/(n-1)}$; n = H - 15, O - 15

Storage

It is recommended that the laboratory standard is stored upside down in a cool dark place in the bottle provided to prevent evaporation. It is suggested that the laboratory standard is shaken before use, to ensure the contents are well mixed. As a laboratory standard is used you may wish to transfer the water to a smaller, dry, glass bottle with a gas-tight sealing top to reduce the volume of air in contact with the water.

Calibrated on July 7th 2020

For and on behalf of: Iso-Analytical The Quantum, Phase 3 Marshfield Bank Crewe, Cheshire, CW2 8UY UK
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