

NATIONAL BUREAU OF STANDARDS

Gaithersburg, MD 20899

January 27, 1986

Dear Colleague:

The following are believed to be the best values available as of the above date for the light stable isotope reference materials:

V-SMOW (Water)

$$D/H = 155.76 \pm 0.05 \times 10^{-6} \text{ Absolute}$$

$$^{18}O/^{16}O = 2005.20 \pm 0.45 \times 10^{-6} \text{ Absolute}$$

SLAP (Water)

$$D = -428 \text{ vs V-SMOW}$$

$$^{18}O = -55.5 \text{ vs V-SMOW}$$

GISP (Water)

$$D = -189.7 \text{ vs V-SMOW}$$

$$^{18}O = -24.79 \text{ vs V-SMOW}$$

OGS (Barium Sulphate)

$$^{34}S = 20.58 \text{ vs CDT}$$

$$^{18}O = 9.31 \text{ vs V-SMOW}$$

Soufre de Lacq (Sulfur)

$$^{34}S = 17.3 \text{ vs CDT}$$

N-1 (Ammonium Sulphate)

$$^{15}N = 1.36 \text{ vs NBS-14 (Air)}$$

N-2 (Ammonium Sulphate)

$$^{15}N = 20.85 \text{ vs NBS-14 (Air)}$$

N-SVEC (Nitrogen Gas)

$$^{14}N/^{15}N = 273.0 \text{ Absolute}$$

L-SVEC (Lithium Carbonate)

$$^6Li/^7Li = 0.083656 \pm 0.000003 \text{ Absolute}$$

NBS-16 (Carbon Dioxide)

$$^{13}C = -41.48 \text{ vs PDB}$$

$$^{18}O = -36.09 \text{ vs PDB}$$

$$^{18}O = 3.89 \text{ vs V-SMOW}$$

NBS-17 (Carbon Dioxide)

$$^{13}C = -4.41 \text{ vs PDB}$$

$$^{18}O = -18.71 \text{ vs PDB}$$

$$^{18}O = 21.99 \text{ vs V-SMOW}$$

NBS-18 (Carbonatite)

$$^{13}C = -5.00 \text{ vs PDB}$$

$$^{18}O = -23.00 \text{ vs PDB}$$

$$^{18}O = 7.20 \text{ vs V-SMOW}$$

NBS-19 (TS Limestone)

$^{13}\text{C} = 1.92$ vs PDB
 $^{18}\text{O} = -2.19$ vs PDB
 $^{18}\text{O} = 28.65$ vs V-SMOW

NBS-20 (Solenhofen Limestone)

$^{13}\text{C} = -1.06$ vs PDB
 $^{18}\text{O} = -4.14$ vs PDB
 $^{18}\text{O} = 26.64$ vs V-SMOW

NBS-21 (Spectrographic Graphite)

$^{13}\text{C} = -28.10$ vs PDB

NBS-22 (Hydrocarbon Oil)

$^{13}\text{C} = -29.63$ vs PDB

NBS-28 (Sand)

$^{18}\text{O} = 9.64$ vs V-SMOW

NBS-30 (Biotite)

Material has 3.5% water with values of:

D = -64 vs V-SMOW
 $^{18}\text{O} = 5.10$ vs V-SMOW

NBS-123 (Sphalerite)

$^{34}\text{S} = 17.32 \pm 0.12$ Tentative

NBS-127 (Sea Water Sulphate)

Not yet set

Values are given as delta values vs the indicated material in parts per thousand or per mille unless otherwise stated.

Oxygen isotope data assume a carbon dioxide - water fractionation factor of 1.04120 where applicable. Also assumed is the value of 1.01025 for oxygen isotopic fractionation between carbon dioxide evolved from calcite by treatment with 100% H_3PO_4 at 25 °C and the value of -4.14 per mil of CO_2 evolved by reaction at 25 °C of 100% H_2PO_4 with NBS-20 relative to CO_2 evolved in a like manner for PDB calcite.

Values are based on my evaluation of the best available and, in many cases, are based on personal communications, however, see T.B. Coplen, C. Kendall, and J. Hopple, Comparison of Stable Isotope Reference Materials, Nature, 302, 236-238 (1983), as amended 8/1/83. This may be obtained from me or from T.B. Coplen, U.S.G.S., 432 National Center, Reston VA 22092.

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