



^{34}S & ^{18}O SULFATE (SO_4) AND SULFIDE (S_2) ANALYSIS IN SOLID SAMPLES

Sample Analysis:

Dried and powdered samples are weighed into tin cups for separate ^{18}O and ^{34}S analysis with a replicate every 3 samples. Approximately 0.1 mg of sample is used for ^{18}O - SO_4 analysis. ^{18}O samples are combusted at 1430°C , and purified by gas chromatography before continuous flow isotope ratio mass spectrometry. Analysis is carried out on a Finnigan Mat, DeltaPlus XL IRMS coupled with a Thermo Scientific TC/EA. Data is corrected and normalized using four international standards: USGS 32, NBS 127, IAEA SO5, and IAEA SO6, that bracket the samples. Standards are analyzed at the beginning and end of every run.

The analytical precision for analysis is $\pm 0.5\%$.

Approximately 0.3 mg of sample is used for ^{34}S - SO_4 analysis and 0.2 mg for ^{34}S - S_2 analysis, with 3 mg of niobium pentoxide added to each sample to ensure complete sample combustion. A replicate sample is included every 3 samples. Samples are loaded into a Fisons Instruments elemental analyzer to be flash combusted at 1100°C . Released gases are carried by ultrapure helium through the analyzer, then separated by gas chromatography. Clean SO_2 gas is carried into the Mat 253, Thermo Scientific, IRMS for analysis. Data is corrected and normalized using three international standards, IAEA SO6, IAEA SO5, NBS 127, and two calibrated internal standards that bracket the samples. Standards are analyzed at the beginning and end of every run.

The analytical precision for analysis is $\pm 0.5\%$.