

# A novel safe, simple, and rapid technique for $\delta^{18}\text{O}$ analysis of quartz

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Stable oxygen isotope analysis of silicates and oxides presents a frustrating conundrum in that many researchers are keen to utilize these analyses in their research, but these analyses require the use of extremely hazardous reagents, and also a very high level of operator skill and training.

A novel continuous flow very high temperature elemental analyzer – mass spec (high-T EA-MS) technique has been developed to perform  $\delta^{18}\text{O}$  analyses of quartz. This technique is straightforward, rapid, and most importantly, requires no hazardous reagents. Samples are reacted at temperatures up to 3000°C in a stream of helium in the presence of graphite, using a graphite-electrode furnace (otherwise known as inert gas fusion analysis) to produce CO gas which is analyzed for  $\delta^{18}\text{O}$  by continuous flow – mass spec analysis. Sample run times approach 10 minutes per analysis.

Results to date indicate an excellent correlation between  $\delta^{18}\text{O}$  analyses of  $\text{SiO}_2$  performed by the new high-T EA-MS technique vs. a laser fluorination technique (below: analyses normalized using  $\delta^{18}\text{O} = +9.6\text{‰}$  for NBS28 quartz).  $\delta^{18}\text{O}$  analyses performed by both techniques have comparable uncertainties of approx.  $\pm 0.15\text{‰}$  ( $1\sigma$ ). Method development continues, particularly the application of the new technique to analyze additional silicate and oxide minerals.

