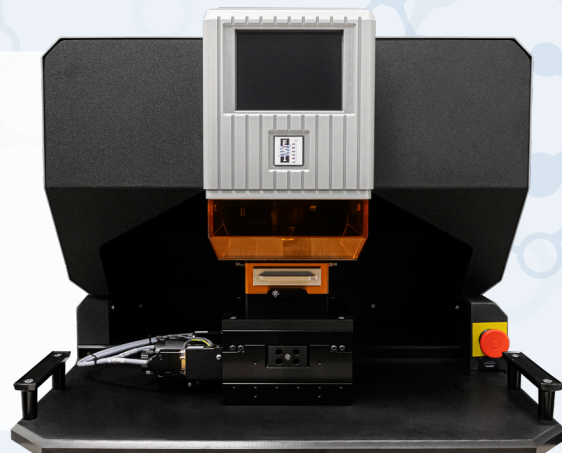


## Bobcat LAIR-UV

Accurate and precise carbon isotope data made possible with a direct low He flow optimized sample chamber



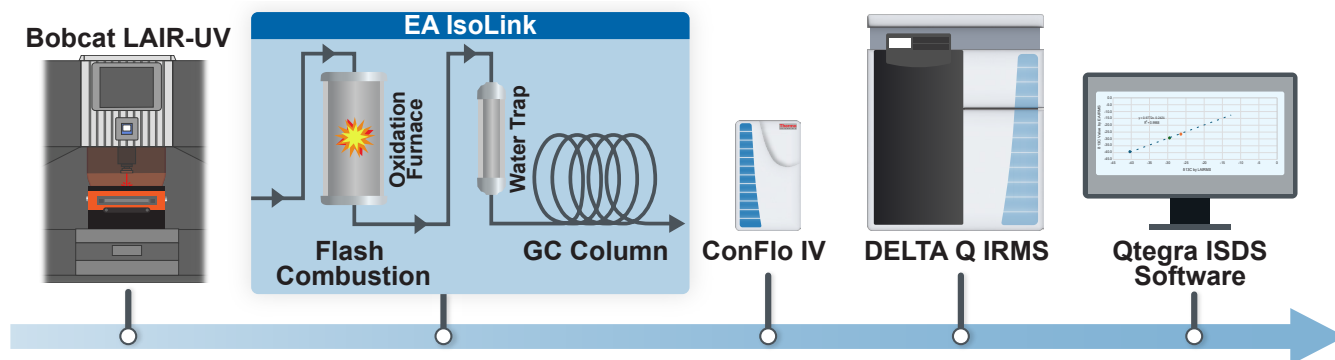
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## Determination of the Accuracy and Precision of Bobcat LAIR-UV when Coupled Directly with the DELTA Q IRMS

### Synopsis

Certified reference materials were analyzed by Bobcat LAIR-UV while coupled to a Thermo Scientific™ DELTA™ Q IRMS to assess the accuracy and precision of the integrated setup under routine operating conditions. The materials were quickly and easily loaded into the chamber before laser ablation was performed using a 250 µm spot. The aerosol generated from the reference material was then directly transported to the LAIR-MS using the

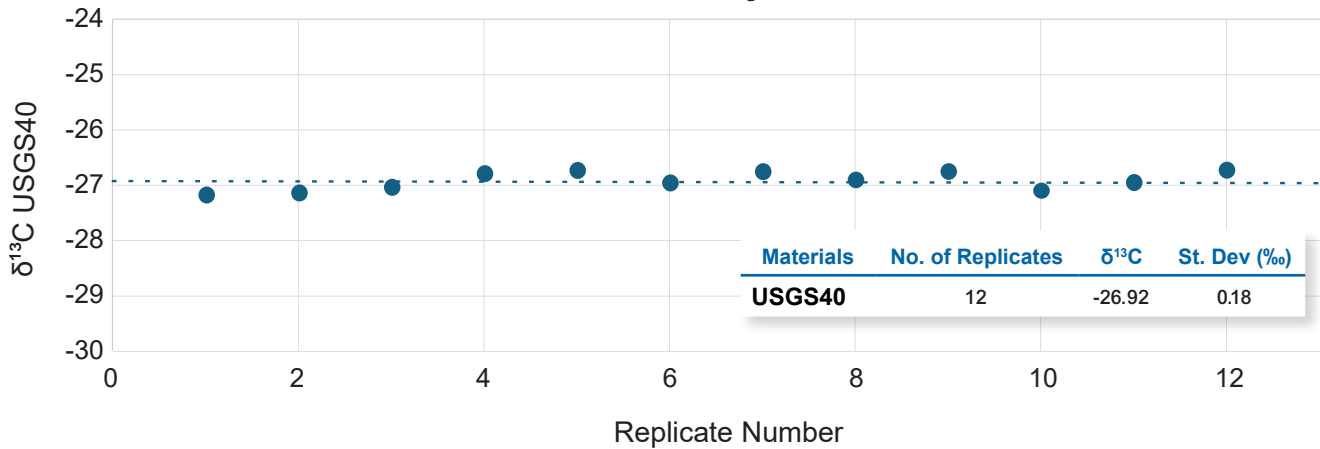
low helium carrier flow required for stable IRMS operation. Data reduction and peak integration was completed in the Thermo Scientific™ Qtegra™ ISDS Software, then compared to published certified values and EA-IRMS measurements of the same materials. Bobcat LAIR-UV results showed excellent agreement and high reproducibility for all standards; USGS40 produced a standard deviation of 0.18 ‰ (n = 12).



The schematic above illustrates the instrument set up used to carry out this experiment. The Bobcat LAIR-UV couples to a DELTA Q IRMS with material being transported from the cell, through the Thermo Scientific™ EA IsoLink™ System and finally to the DELTA Q IRMS via the ConFlo IV Universal Interface.

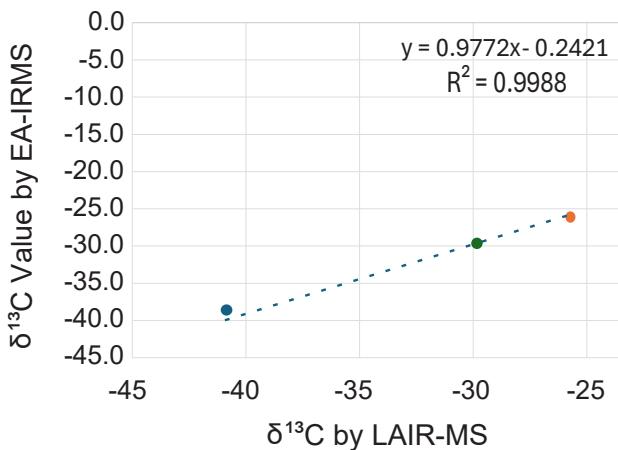
# Testing the performance of Bobcat LAIR-UV when Combined with the DELTA Q IRMS

## Precision of Bobcat LAIR-UV Analysis of USGS40 Standard



Experiment results show the precision of Bobcat LAIR-UV analysis using the USGS40 Certified Reference Material. The analysis was repeated using twelve subsequent ablation craters. Results showed excellent precision with a standard deviation value of only 0.18 ‰. Importantly, the results were obtained with the absence of a liquid nitrogen cooled trap since the sensitivity was acceptably high without it. However, the same quality of result, with the sharpest possible peaks, can be obtained using smaller spot sizes by employing a liquid nitrogen cooled trap.

## Study of the Linearity of Bobcat LAIR-UV Analysis of Known Standards



LAIR-MS analysis was carried out on a range of certified reference materials to assess the agreement of the data generated to data obtained by traditional EA-IRMS analysis. The slope of the known to unknown was 0.9772, with a R<sup>2</sup> of 0.9988. This shows a very strong agreement between the two techniques. Furthermore, in all cases, the standard deviation of the results was excellent (0.02 to 0.2 ‰).

Materials	δ <sup>13</sup> C Measured	St. Dev (‰) by LAIR-MS	δ <sup>13</sup> C Published	St. Dev (‰) by EA-IRMS
Act-2	-29.30	0.20	-29.50	0.02
USGS40	-26.50	0.03	-26.39	0.04
EDTA	-39.40	0.02	-40.38	0.01

## Conclusion

Bobcat LAIR-UV yielded accurate and precise δ<sup>13</sup>C results, for a range of materials when combined with the DELTA Q IRMS. The technique has been shown to be highly reproducible over a number of replicates on the same sample, giving a standard deviation of just 0.18 ‰. Importantly, the data was obtained without the use of a liquid nitrogen cooled trap which further simplifies the workflow. Results demonstrate the applicability of the Bobcat LAIR-UV technique in providing high quality data, maintaining spatial integrity of the sample, and with minimal sample preparation.

