Sample (p*mol ala/µL*)	Procedural Blank #	First Step	% of signal relative to Murchison			*Max pmol ala/µL*
			Σ12C Counts	Σ13C Counts	Σ12C Intensity	
Methods Development Murchison, January 2018 (29)	Hexane	Pure Hexane	0.1%	0.0%	0.0%	0.11
	1	Transfer of Meteorite to GC vial Run Prior to Derivatization	0.5%	0.1%	0.2%	0.45
	2	Extraction of meteorite at NASA	0.8%	0.2%	0.2%	2.4
	3	Transfer of Meteorite to GC vial	0.3%	0.0%	0.1%	1.0
Methods Development Murchison, March 2018 (29)	Hexane	Pure Hexane	0.0%	0.1%	0.0%	3.1×10^{-3}
	1	Transfer of Meteorite to GC vial Run Prior to Derivatization	0.2%	0.1%	0.1%	5.4×10^{-2}
	2	Extraction of meteorite at NASA	1.0%	0.0%	0.3%	0.29
	3	Transfer of Meteorite to GC vial	5.6%	3.4%	3.7%	1.6
Analytical Murchison, Summer 2018 (15)	Hexane	Pure Hexane	0.0%	0.0%	0.0%	1.3×10^{-3}
	1	Transfer of Meteorite to GC vial Run Prior to Derivatization	0.0%	0.0%	0.1%	1.8×10^{-3}
	2	Extraction of meteorite at NASA	1.0%	0.0%	0.2%	0.16
	3	Transfer of Meteorite to GC vial	0.7%	0.0%	0.1%	9.8×10^{-2}
	4	Chemical Derivatization	0.5%	0.0%	0.0%	6.9×10^{-2}

Table S1. Blank IDs and possible contamination to Murchison.

Analysis Set	Date	Scan Range	% of signal relative to alanine		Maximum ‰ change in ^{13}R
			$\Sigma^{12}C$ Counts	$\Sigma^{13}C$ Counts	
Methods Development Murchison, January 2018	1/3	135-146 *RE*	0.08%	0.05%	-0.061
	1/3	135-146 *RE*	0.31%	0.29%	-0.037
	1/3	135-146 *RE*	0.16%	0.14%	-0.027
	1/4	50-300 *DE*	0.00%	0.00%	0.000
	1/6	50-300 *DE*	0.04%	0.00%	-0.091
	1/7	50-300 *DE*	0.09%	0.00%	-0.086
	1/7	50-300 *DE*	0.31%	0.10%	-0.210
	1/7	181-187 *RE*	0.00%	0.05%	0.048
Methods Development Murchison, March 2018	3/26	50-500 *DE*	0.0%	0.0%	-0.002
	3/26	50-500 *DE*	0.0%	0.0%	-0.007
	3/27	135-146 *RE*	0.0%	0.0%	0.000
	3/29	181-187 *RE*	0.0%	0.2%	0.199
	3/30	181-187 *RE*	0.0%	0.3%	0.282
	3/31	181-187 *RE*	0.0%	2.8%	2.756
Analytical Murchison, Summer 2018	6/27	135-146 *RE*	0.12%	0.12%	-0.002
	6/27	135-146 *RE*	0.12%	0.11%	-0.010
	6/27	135-146 *RE*	0.16%	0.16%	-0.002
	7/12	181-187 *RE*	0.52%	0.49%	-0.033
	7/12	181-187 *RE*	0.00%	0.07%	0.045
	7/12	181-187 *RE*	0.04%	0.01%	-0.033
	7/13	181-187 *RE*	0.05%	0.04%	-0.013
	7/16	108-118 *RE*	5.52%	6.20%	0.644

Table S2. Background from blanks during measurement. RE denotes samples analyzed using Reservoir Elution mode while DE denotes samples analyzed using Direct Elution mode.

Analysis Set	Sample	Analysis Number used	
		140	184
Winter 2018	Alfa Aesar	28, 29	47-49, 51-53, 61-62
	Strecker	30	64-67
	Methods Development Murchison	24-25	45-46, 55-59
Spring 2018	Alfa Aesar	75, 83	94, 97-99, 104
	Strecker	74, 80	x
	Methods Development Murchison	78, 84-86	101-103, 105-106
Summer 2018	Alfa Aesar	128, 131, 134-137	162, 166-167
	Strecker	139-140	159, 161
	Analytical Murchison	142, 144, 147	164-165

Table S3. Analysis numbers of measurements used to calculate ^{13}R values from samples and standards. Analysis numbers correspond to values found in Dataset S1 and were used to calculate ratios found in Table S2.