Supporting Information

Experimental investigation of improved tolerance for concentration mismatch in potassium isotope analysis on a hexapole collision cell MC-ICP-MS (Nu Sapphire)

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1. Table S1

Table S1. Result of K isotopic bias and beam intensity with variable RF Ref. voltage. Other Operating condition was RF Bias Ref. = -0.8 V, He gas flow = 2 sccm, and H_2 gas flow = 5 sccm.

RF Ref. (V)	$\delta^{41}K$ (‰)	2SD	$^{41}K/^{39}K$	1SE	Intensity (V)	K_{sam}/K_{std} (GSB solutions)
0.60	0.165	0.037	0.07708	3.20E-07	154	0.9
0.75	0.081	0.027	0.07739	3.31E-07	174	0.9
0.90	0.018	0.016	0.07755	3.13E-07	186	0.9
1.05	0.001	0.032	0.07767	3.24E-07	203	0.9
1.20	-0.023	0.022	0.07774	4.13E-07	212	0.9
1.35	-0.045	0.034	0.07790	4.67E-07	223	0.9
1.50	-0.113	0.034	0.07817	8.19E-07	224	0.9
1.80	-0.113	0.065	0.07959	1.06E-06	224	0.9

2. Table S2

Table S2. Result of K isotopic bias and beam intensity with variable RF Bias Ref. voltage under the selected RF Ref. voltage. Other Operating condition was He gas flow = 2 sccm, and H_2 gas flow = 5 sccm.

RF Bias Ref. (V)	$\delta^{41}K$ (‰)	2SD	$^{41}K/^{39}K$	1SE	Intensity (V)	K_{sam}/K_{std} (GSB Solutions)
RF Ref. = 0.75 V						
-1.0	0.100	0.014	0.07725	2.28E-07	176	0.9
-0.8	0.081	0.027	0.07739	3.31E-07	174	0.9
-0.6	0.051	0.017	0.07754	2.53E-07	173	0.9
-0.4	0.031	0.012	0.07763	3.46E-07	172	0.9
-0.2	0.006	0.023	0.07774	2.91E-07	167	0.9
0	0.000	0.030	0.07784	4.67E-07	161	0.9
0.2	-0.038	0.029	0.07794	6.57E-07	155	0.9
RF Ref. = 1.05 V						
-1.2	0.028	0.024	0.07743	2.93E-07	215	0.9
-1.0	0.012	0.011	0.07757	2.40E-07	210	0.9
-0.8	0.001	0.018	0.07767	3.24E-07	203	0.9
-0.6	-0.001	0.014	0.07776	3.67E-07	202	0.9
-0.4	-0.031	0.011	0.07784	4.83E-07	196	0.9
-0.2	-0.034	0.034	0.07791	4.61E-07	187	0.9
0	-0.034	0.034	0.07798	5.11E-07	179	0.9
RF Ref. = 1.50 V						
-0.6	-0.142	0.029	0.0783	7.25E-07	231	0.9
-0.8	-0.160	0.041	0.07826	7.09E-07	241	0.9
-1.0	-0.155	0.045	0.07822	8.08E-07	248	0.9
-1.2	-0.147	0.016	0.0782	7.90E-07	253	0.9
-1.4	-0.094	0.043	0.07814	6.97E-07	253	0.9
-1.6	-0.096	0.042	0.07808	9.57E-07	254	0.9
-1.8	-0.053	0.082	0.07801	8.35E-07	254	0.9
-2.0	-0.029	0.069	0.07793	1.14E-06	252	0.9
-2.2	0.056	0.060	0.07787	1.27E-06	243	0.9

3. Table S3

Table S3. Result of K isotopic bias and beam intensity with variable H_2 and He flow rates. Other Operating condition was RF Ref. = 1.05 V, and Ref Bias Ref. = -0.8 V.

H_2 (sccm)	**He (sccm)**	**$\delta^{41}K$ (‰)**	**2SD**	**$^{41}K/^{39}K$**	**1SE**	**Intensity (V)**	**K_{sam}/K_{std} (GSB Solutions)**
3	2	0.023	0.200	0.07601	2.15E-06	209	0.9
5	2	-0.001	0.005	0.07764	2.96E-07	210	0.9
7	2	0.009	0.024	0.07794	3.65E-07	190	0.9
9	2	-0.148	0.055	0.07839	5.78E-07	172	0.9
5	0	-0.068	0.025	0.07608	2.82E-07	215	0.9
5	4	-0.011	0.009	0.07803	2.71E-07	188	0.9
5	6	-0.043	0.023	0.07834	2.90E-07	166	0.9
5	8	-0.120	0.039	0.07888	6.78E-07	146	0.9

4. Table S4

Table S4 Result of K concentration mismatch tests. Operating condition was RF Bias Ref. voltage = -0.8 V, He gas flow = 2 sccm, and H_2 gas flow = 5 sccm.

K_{sam}/K_{std}	$\delta^{41}K$ (‰)	2SD	N	Sam/std
RF Ref. = 1.05 V				
0.46	-0.123	0.025	5	3141a / 3141a
0.66	-0.038	0.028	5	3141a / 3141a
0.76	-0.036	0.020	5	3141a / 3141a
0.84	-0.018	0.018	5	3141a / 3141a
0.87	-0.006	0.031	5	3141a / 3141a
0.98	-0.008	0.023	5	3141a / 3141a
1.00	0.001	0.010	5	3141a / 3141a
1.07	0.014	0.011	5	3141a / 3141a
1.20	0.018	0.023	5	3141a / 3141a
1.24	0.042	0.011	5	3141a / 3141a
1.47	0.061	0.005	5	3141a / 3141a
0.46	-0.529	0.043	5	AGV-2 / 3141a
0.65	-0.482	0.031	5	AGV-2 / 3141a
0.74	-0.467	0.022	5	AGV-2 / 3141a
0.83	-0.449	0.033	5	AGV-2 / 3141a
0.93	-0.429	0.031	5	AGV-2 / 3141a
1.01	-0.427	0.019	5	AGV-2 / 3141a
1.14	-0.410	0.015	5	AGV-2 / 3141a
1.23	-0.393	0.026	5	AGV-2 / 3141a
1.38	-0.365	0.034	5	AGV-2 / 3141a
RF Ref. = 1.50 V				
0.61	-0.443	0.056	5	3141a / 3141a
0.72	-0.322	0.054	5	3141a / 3141a
0.75	-0.254	0.048	5	3141a / 3141a
0.85	-0.182	0.036	5	3141a / 3141a
0.98	-0.035	0.072	5	3141a / 3141a
1.00	-0.001	0.061	5	3141a / 3141a
1.02	0.033	0.058	5	3141a / 3141a
1.08	0.091	0.059	5	3141a / 3141a
1.15	0.173	0.050	5	3141a / 3141a
1.26	0.310	0.047	5	3141a / 3141a
1.44	0.564	0.067	5	3141a / 3141a