

Supplementary Tables

Supplementary table 1: Primary Analytical Results of Sedimentary Reference Materials

Material Description	Replicate Number	Sulphur (wt. %)	$\delta^{34}\text{S}_{\text{VCDT}}$ (‰)	Material Description	Number of Analyses	Sulphur (wt. %)	$\delta^{34}\text{S}_{\text{VCDT}}$ (‰)	Material Description	Number of Analyses	Sulphur (wt. %)	$\delta^{34}\text{S}_{\text{VCDT}}$ (‰)
GSJ JMS-1 (Modern Shallow Marine Surface Sediments)	1	1.25	-18.47	GSJ JMS-2 (Modern Deep Marine Surface Sediments)	1	0.24	-	USGS SBC-1 (Ancient Organic Rich Marine Shale)	1	0.69	-39.33
	2	1.29	-18.85		2	0.30	-		2	0.69	-39.25
	3	1.28	-19.11		3	0.32	-		3	0.71	-38.96
	4	1.33	-18.95		4	0.35	20.99		4	0.66	-39.59
	5	1.32	-19.26		5	0.33	21.63		5	0.68	-40.04
	6	1.32	-19.22		6	0.34	21.84		6	0.69	-39.80
	7	1.31	-19.33		7	0.34	21.88		7	0.68	-38.85
	8	1.33	-19.12		8	0.34	22.00		8	0.70	-38.82
	9	1.32	-19.18		9	0.29	21.88		9	0.67	-39.81
	10	1.33	-18.96		10	0.35	22.08		10	0.69	-39.78
	11	1.33	-19.22		11	0.32	22.04		11	0.70	-38.56
	12	1.31	-19.13		12	0.33	21.96		12	0.70	-39.31
	Mean	1.31	-19.07		Mean	0.32	21.81		Mean	0.69	-39.34
Reproducibility ($\pm 1\sigma$)	0.03	0.24	Reproducibility ($\pm 1\sigma$)	0.03	0.33	Reproducibility ($\pm 1\sigma$)	0.02	0.47			
	Relative Standard Deviation (%RSD)	1.95	-		Relative Standard Deviation (%RSD)	9.99	-		Relative Standard Deviation (%RSD)	2.22	-
	Total Number of Analyses	12	12		Total Number of Analyses	12	9		Total Number of Analyses	12	12
	Standard Error	0.01	0.07		Standard Error	0.01	0.11		Standard Error	0.00	0.1

Supplementary table 2: Repeated Analytical Results of GSJ JMS–2 (Sedimentary Reference Material)

Batch	Replicate Number	Sulphur (wt. %)	$\delta^{34}\text{S}_{\text{VCDT}}$ (‰)	Batch	Number of Analyses	Sulphur (wt. %)	$\delta^{34}\text{S}_{\text{VCDT}}$ (‰)
1	1	0.28	20.74	2	1	0.33	
	2	0.26	21.22		2	0.29	21.73
	3	0.27	21.26		3	0.29	21.53
	4	0.26	21.38		4	0.29	21.58
	–	–	–		5	0.30	21.44
	Mean	0.27	21.15		Mean	0.30	21.57
	Reproducibility ($\pm 1\sigma$)	0.01	0.25		Reproducibility ($\pm 1\sigma$)	0.02	0.10
	Relative Standard Deviation (%RSD)	2.83	–		Relative Standard Deviation (%RSD)	5.32	–
	Total Number of Analyses	4	4		Total Number of Analyses	5	5
	Standard Error	0.00	0.12		Standard Error	0.01	0.05

Supplementary table 3: Primary Analytical Results of Magmatic Reference Materials

Material Description	Replicate Number	Sulphur (wt. %)	$\delta^{34}\text{S}_{\text{VCDT}}$ (‰)	Material Description	Number of Analyses	Sulphur (wt. %)	$\delta^{34}\text{S}_{\text{VCDT}}$ (‰)	Material Description	Number of Analyses	Sulphur (wt. %)	$\delta^{34}\text{S}_{\text{VCDT}}$ (‰)
USGS WMS-1a (Mafi-ultramafic hosted Massive Ni-Cu-Co-PGE Sulphides)	1	25.79	-3.49	UGSG WMG-1a (Au-PGE Bearing Sulphide Mineralised Gabbro)	1	3.48	-4.25	USGS PTM-1a (Sudbury Igneous Complex Hosted Noble Metal Bearing Ni-Cu Sulphides)	1	22.64	4.10
	2	27.25	-3.49		2	3.36	-4.04		2	22.48	3.49
	3	27.13	-3.50		3	3.51	-4.45		3	22.98	3.89
	4	26.28	-3.66		4	3.31	-4.18		4	22.26	3.62
	5	26.33	-3.45		5	3.42	-4.56		5	23.00	4.10
	6	26.43	-3.72		6	3.46	-4.29		6	22.59	3.56
	7	27.33	-3.46		7	3.53	-4.61		7	22.25	4.10
	8	25.76	-3.75		8	3.46	-4.21		8	22.68	3.61
	9	26.39	-3.24		9	3.37	-4.71		9	22.37	4.07
	10	24.64	-3.60		10	3.49	-4.16		10	22.52	3.58
	11	25.96	-3.35		11	3.32	-4.70		11	21.76	4.27
	12	26.31	-3.85		12	3.46	-4.34		12	22.54	3.63
	Mean	26.30	-3.55		Mean	3.43	-4.38		Mean	22.51	3.84
	Reproducibility ($\pm 1\sigma$)	0.75	0.17		Reproducibility ($\pm 1\sigma$)	0.07	0.23		Reproducibility ($\pm 1\sigma$)	0.33	0.28
		Relative Standard Deviation (%RSD)	2.84		-	Relative Standard Deviation (%RSD)	2.14		-	Relative Standard Deviation (%RSD)	1.48
	Total Number of Analyses	12	12	Total Number of Analyses	12	12	Total Number of Analyses	12	12		
	Standard Error	0.22	0.05	Standard Error	0.02	0.06	Standard Error	0.10	0.0		

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Material Description	Replicate Number	Sulphur (wt. %)	$\delta^{34}\text{S}_{\text{VCDT}}$ (‰)	Material Description	Number of Analyses	Sulphur (wt. %)	$\delta^{34}\text{S}_{\text{VCDT}}$ (‰)
USGS SU-1b (Sudbury Igneous Complex Hosted Ni-Cu-Co Sulphides)	1	12.78	4.09	USGS PTC-1b (Au-PGE Bearing Sulphide Mineralised Gabbro)	1	28.01	2.57
	2	12.77	3.71		2	29.38	2.52
	3	13.11	4.36		3	28.29	2.76
	4	13.24	3.79		4	29.00	2.58
	5	12.89	4.29		5	28.74	2.93
	6	12.80	3.71		6	28.97	2.69
	7	12.47	4.48		7	28.99	2.95
	8	13.67	3.85		8	28.20	2.71
	9	13.05	4.45		9	28.14	2.98
	10	13.13	3.69		10	28.99	2.61
	11	13.53	4.16		11	28.96	3.06
	12	12.94	3.73		12	28.84	2.74
	Mean	13.03	4.03		Mean	28.71	2.76
Reproducibility ($\pm 1\sigma$)	0.34	0.31	Reproducibility ($\pm 1\sigma$)	0.44	0.18		

Relative Standard Deviation (%RSD)	2.58	-	Relative Standard Deviation (%RSD)	1.52	-
Total Number of Analyses	12	12	Total Number of Analyses	12	12
Standard Error	0.10	0.09	Standard Error	0.13	0.05

Supplementary table 4: Primary Analytical Results of Hydrothermal Reference Materials

Material Description	Replicate Number	Sulphur (wt. %)	$\delta^{34}\text{S}_{\text{VCDT}}$ (‰)	Material Description	Number of Analyses	Sulphur (wt. %)	$\delta^{34}\text{S}_{\text{VCDT}}$ (‰)
GSJ JZn-1 (Skarn-type Pb-Zn Sulphides)	1	1.26	2.33	GSJ JCu-1 (Skarn-type Fe-Cu Sulphides)	1	6.97	-0.79
	2	1.21	2.17		2	6.80	-0.66
	3	1.25	2.19		3	6.85	-0.80
	4	1.21	2.08		4	6.84	-0.81
	5	1.25	2.14		5	6.89	-0.77
	6	1.21	2.07		6	6.60	-0.82
	7	1.21	2.09		7	6.86	-0.78
	8	1.23	2.08		8	6.49	-0.83
	9	1.29	2.16		9	5.80	-0.91
	10	1.23	2.18		10	6.65	-0.88
	11	1.24	2.17		11	6.74	-1.16
	12	1.18	2.03		12	7.74	-0.84
	Mean	1.23	2.14		Mean	6.77	-0.84
	Reproducibility ($\pm 1\sigma$)	0.03	0.08		Reproducibility ($\pm 1\sigma$)	0.43	0.12

Relative Standard Deviation (%RSD)	2.35	-	Relative Standard Deviation (%RSD)	6.42	-
Total Number of Analyses	12	12	Total Number of Analyses	12	12
Standard Error	0.01	0.02	Standard Error	0.13	0.03

Supplementary table 5: Repeated Analytical Results of USGS WMS-1a (Magmatic Reference Material)

Batch	Replicate Number	$\delta^{34}\text{S}_{\text{VCDT}}$ (‰)
1	1	-3.73
	2	-3.62
	3	-3.41
	4	-3.53
	5	-3.56
	Mean	-3.57
	Reproducibility ($\pm 1\sigma$)	0.12

Total Number of Analyses	5
Standard Error	0.05

Supplementary table 6: Repeated Analytical Results of USGS SU-1b (Magmatic Reference Material)

Batch	Replicate Number	$\delta^{34}\text{S}_{\text{VCDT}}$ (‰)	Batch	Number of Analyses	$\delta^{34}\text{S}_{\text{VCDT}}$ (‰)
1	1	3.79	2	1	3.78
	2	3.78		2	3.59
	3	3.92		3	3.62
	4	3.85		4	3.77
	5	3.86		5	3.64
	–	–		6	3.58
	Mean	3.84		Mean	3.66
	Reproducibility ($\pm 1\sigma$)	0.06		Reproducibility ($\pm 1\sigma$)	0.09
	Relative Standard Deviation (%RSD)	–		Relative Standard Deviation (%RSD)	–
	Total Number of Analyses	5		Total Number of Analyses	6
Standard Error	0.03	Standard Error	0.04		

Supplementary table 7: Repeated Analytical Results of GSJ JZn-1 (Hydrothermal Reference Material)

Batch	Replicate Number	$\delta^{34}\text{S}_{\text{VCDT}}$ (‰)	Batch	Number of Analyses	$\delta^{34}\text{S}_{\text{VCDT}}$ (‰)	Batch	Number of Analyses	$\delta^{34}\text{S}_{\text{VCDT}}$ (‰)
1	1	2.43	2	1	2.48	3	1	2.45
	2	2.39		2	2.60		2	2.25
	3	2.80		3	2.59		3	2.33
	4	2.69		4	2.69		4	2.38
	–	–		5	2.96		5	2.38
	–	–		–	–		6	2.39
	Mean	2.58		Mean	2.66		Mean	2.36
	Reproducibility ($\pm 1\sigma$)	0.20		Reproducibility ($\pm 1\sigma$)	0.18		Reproducibility ($\pm 1\sigma$)	0.07
Total Number of Analyses	4	Total Number of Analyses	5	Total Number of Analyses	6			
Standard Error	0.10	Standard Error	0.08	Standard Error	0.03			