Table S1. Summary of solubility ratios (f_{2-h}/f_{1-h}, f_{4-h}/f_{2-h}, and f_{8-h}/f_{4-h}) obtained using various contact time (f_{1-h}: solubility with a contact time of 1 h; f_{2-h}: solubility with a contact time of 2 h; f_{4-h}: solubility with a contact time of 4 h; f_{8-h}: solubility with a contact time of 8 h). Q1, Q2 and Q3 represent the first, second and third quartiles. Please note that f_{4-h}/f_{2-h} and f_{8-h}/f_{4-h} were reported in our previous work (Li et al., 2023).

Fe	f_{2-h}/f_{1-h}	f_{4-h}/f_{2-h}	f_{8-h}/f_{4-h}	Al	f_{2-h}/f_{1-h}	f_{4-h}/f_{2-h}	f_{8-h}/f_{4-h}
Min	0.55	0.34	0.43	Min	0.37	0.46	0.46
Q1	0.76	1.17	0.69	Q1	0.74	1.17	0.93
Q2	0.81	1.50	0.79	Q2	0.92	1.35	1.11
Q3	0.88	1.81	1.13	Q3	1.06	2.01	1.50
Max	1.05	2.65	3.85	Max	1.39	3.00	2.33
Mean	0.81±0.13	1.46±0.53	1.01±0.65	Mean	0.91±0.27	1.55±0.60	1.23±0.47
As	f_{2-h}/f_{1-h}	f_{4-h}/f_{2-h}	f_{8-h}/f_{4-h}	**Cu**	f_{2-h}/f_{1-h}	f_{4-h}/f_{2-h}	f_{8-h}/f_{4-h}
Min	0.83	1.15	0.60	Min	0.73	0.48	0.64
Q1	1.02	1.87	0.99	Q1	0.90	1.02	1.04
Q2	1.11	2.67	1.00	Q2	0.94	2.05	1.25
Q3	1.16	4.01	1.05	Q3	1.00	2.75	1.54
Max	1.25	8.77	1.66	Max	1.23	14.04	2.44
Mean	1.08±0.10	3.12±1.85	1.05±0.21	Mean	0.95±0.11	2.45±2.30	1.34±0.45
Mn	f_{2-h}/f_{1-h}	f_{4-h}/f_{2-h}	f_{8-h}/f_{4-h}	**Pb**	f_{2-h}/f_{1-h}	f_{4-h}/f_{2-h}	f_{8-h}/f_{4-h}
Min	0.72	0.83	0.59	Min	0.57	1.04	0.00
Q1	0.90	1.64	0.94	Q1	0.99	2.04	0.63
Q2	0.95	1.95	1.14	Q2	1.06	2.51	0.93
Q3	1.02	2.24	1.36	Q3	1.42	3.00	1.02
Max	1.06	3.23	2.12	Max	13.68	4.14	2.46
Mean	0.93±0.10	1.93±0.54	1.23±0.39	Mean	1.65±2.50	2.54±0.73	0.80±0.49
Zn	f_{2-h}/f_{1-h}	f_{4-h}/f_{2-h}	f_{8-h}/f_{4-h}				
Min	0.34	0.64	0.58				
Q1	0.76	1.06	0.88				
Q2	0.89	1.24	1.07				
Q3	0.97	1.45	1.34				
Max	1.80	3.06	2.38				
Mean	0.85±0.27	1.31±0.53	1.18±0.42				
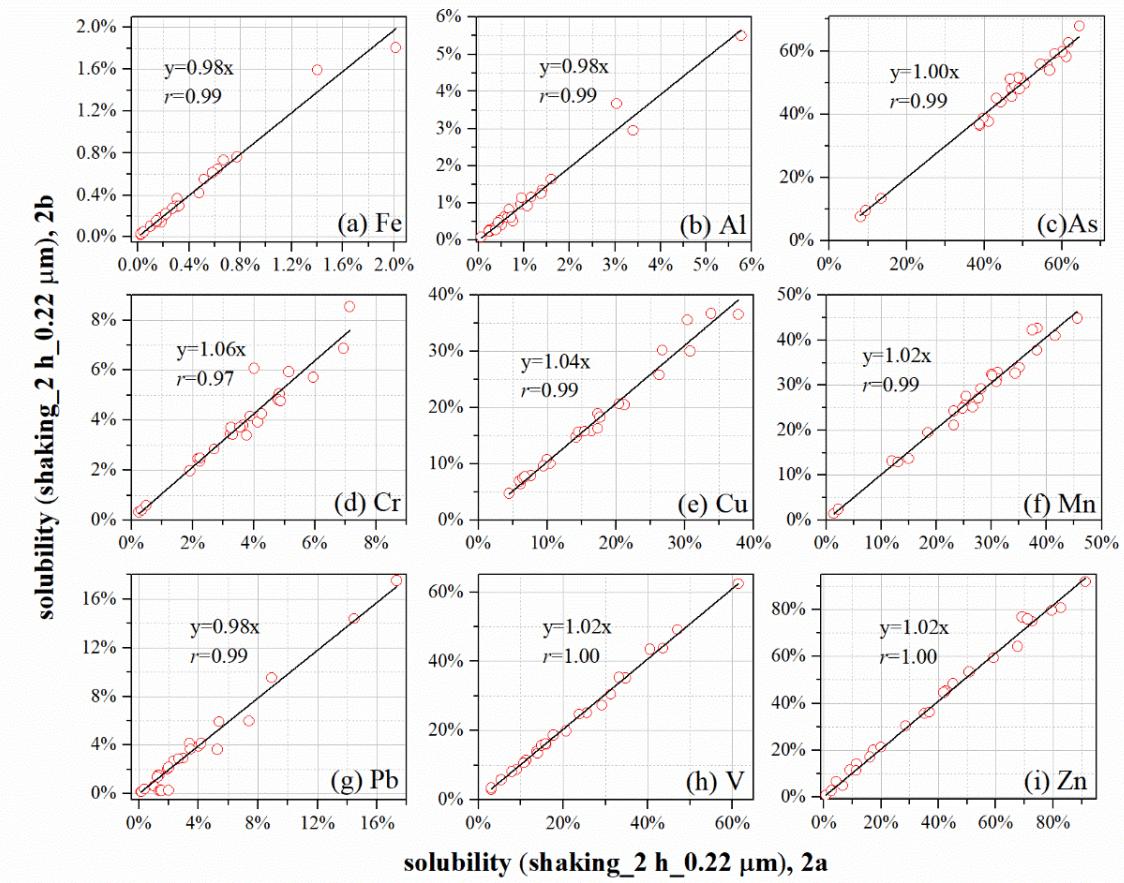
Figure S1. Solubilities of nine elements measured for subsamples 2a versus those measured for subsamples 2b. The two groups of subsamples (2a and 2b) were leached using the same protocol which was normally used at GIG (see Table 1 for more information).
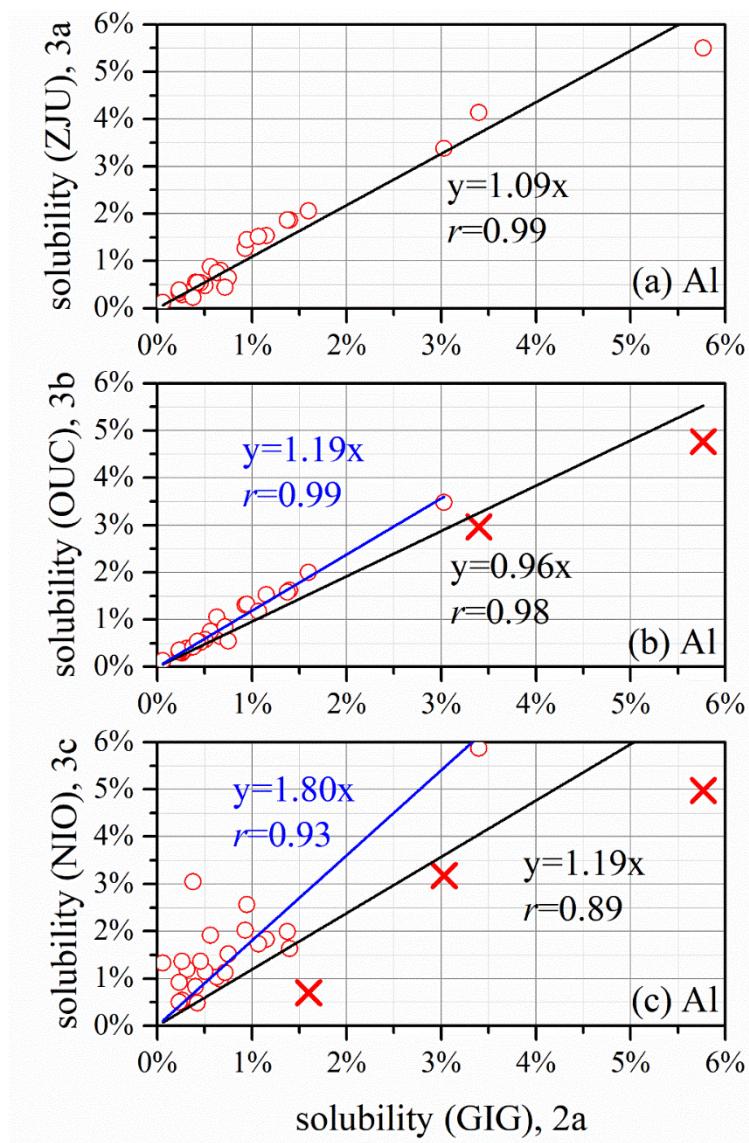
Figure S2. Solubilities of Al determined using the GIG protocol versus those determined using

(a) the ZJU protocol, (b) the OUC protocol and (c) the NIO protocol.
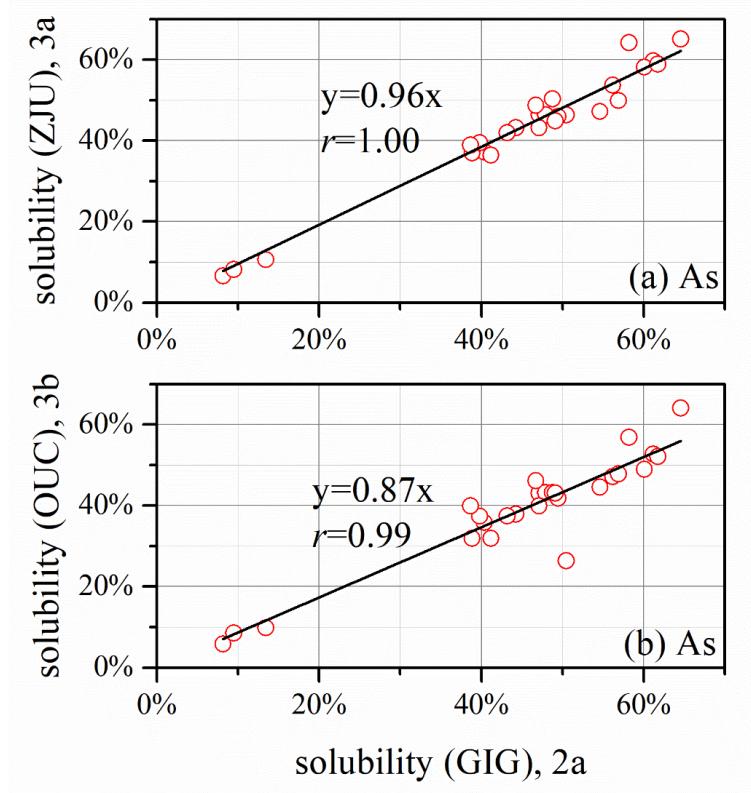
Figure S3. Solubilities of As determined using the GIG protocol versus those determined using

(a) the ZJU protocol and (b) the OUC protocol.
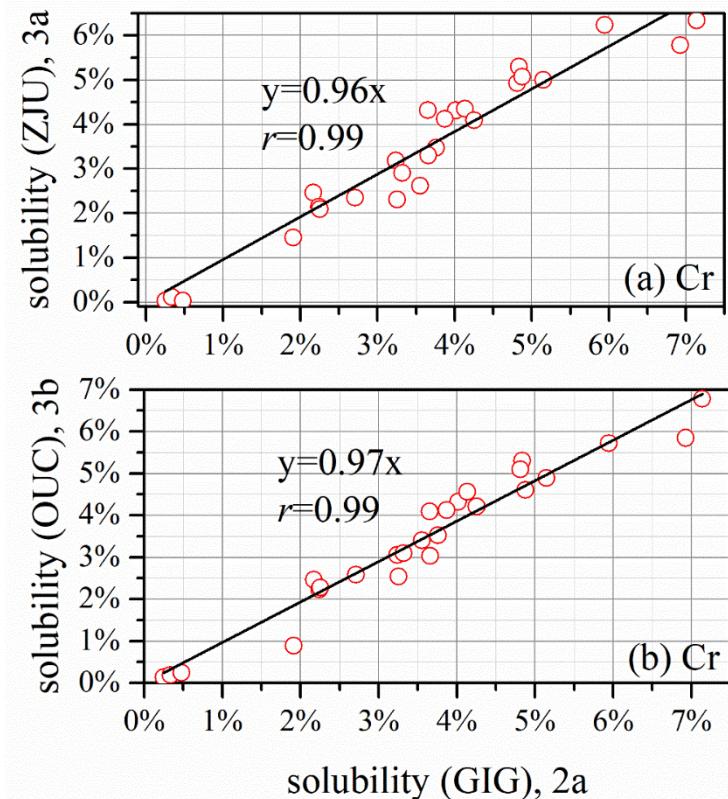
Figure S4. Solubilities of Cr determined using the GIG protocol versus those determined using

(a) the ZJU protocol and (b) the OUC protocol.
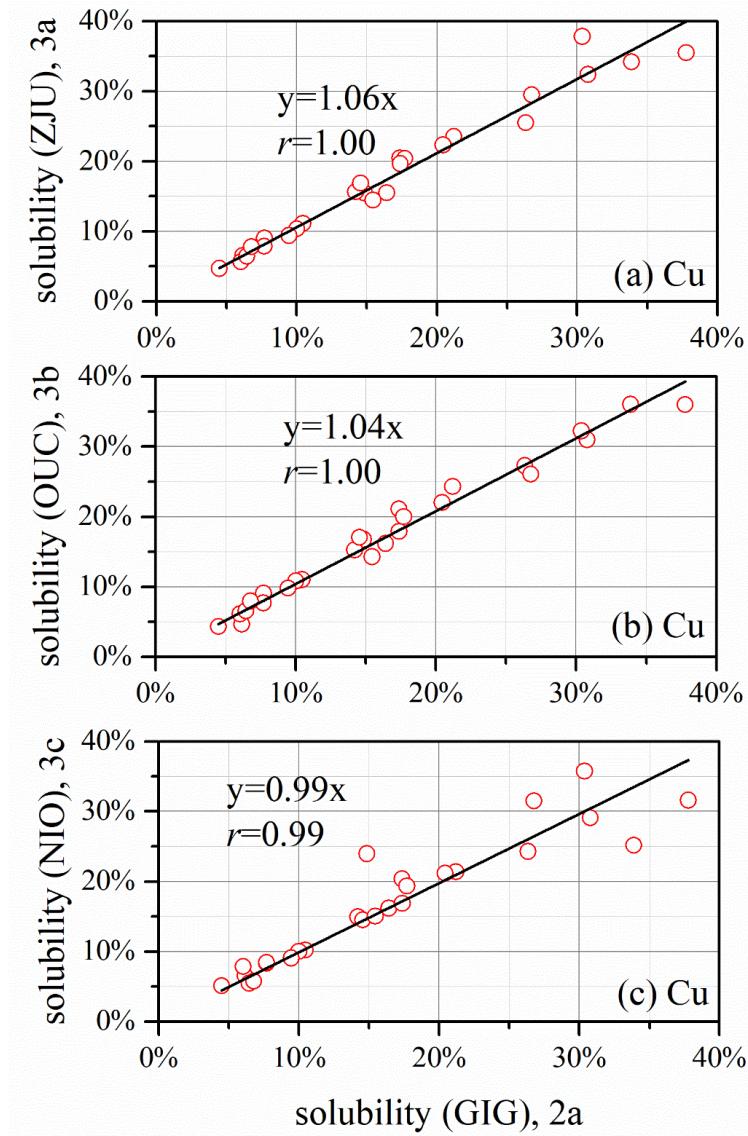
Figure S5. Solubilities of Cu determined using the GIG protocol versus those determined using

(a) the ZJU protocol, (b) the OUC protocol, and (c) the NIO protocol.
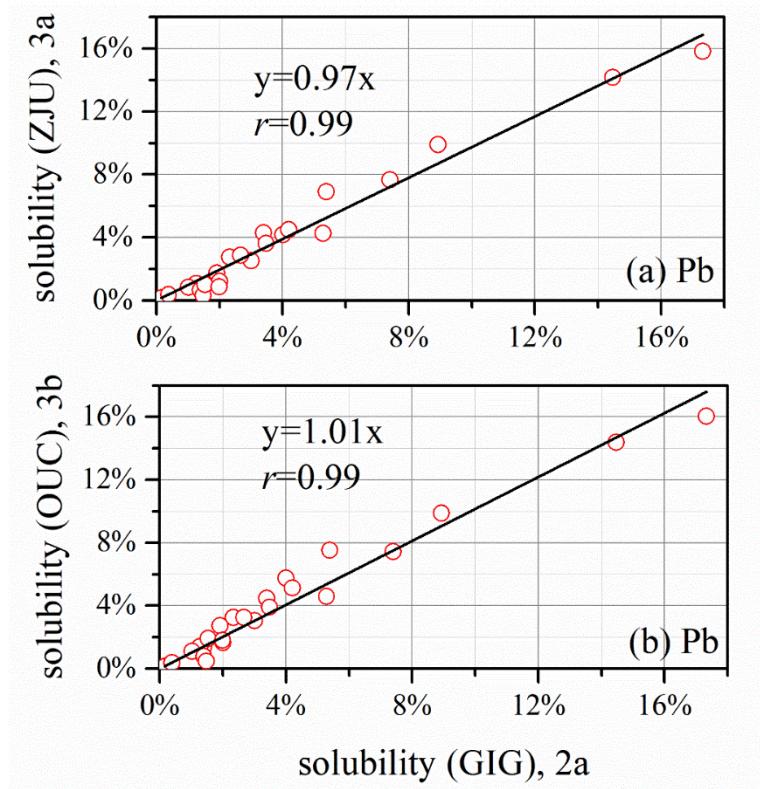
Figure S6. Solubilities of Pb determined using the GIG protocol versus those determined using

(a) the ZJU protocol and (b) the OUC protocol.
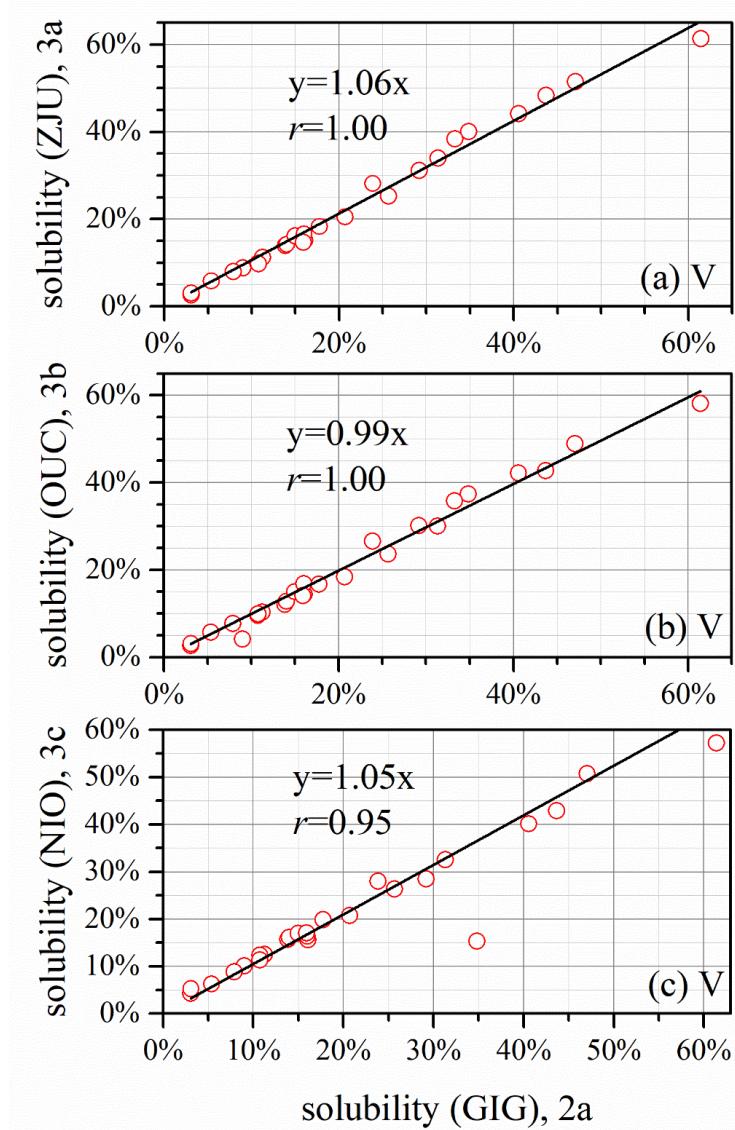
Figure S7. Solubilities of V determined using the GIG protocol versus those determined using

(a) the ZJU protocol, (b) the OUC protocol, and (c) the NIO protocol.
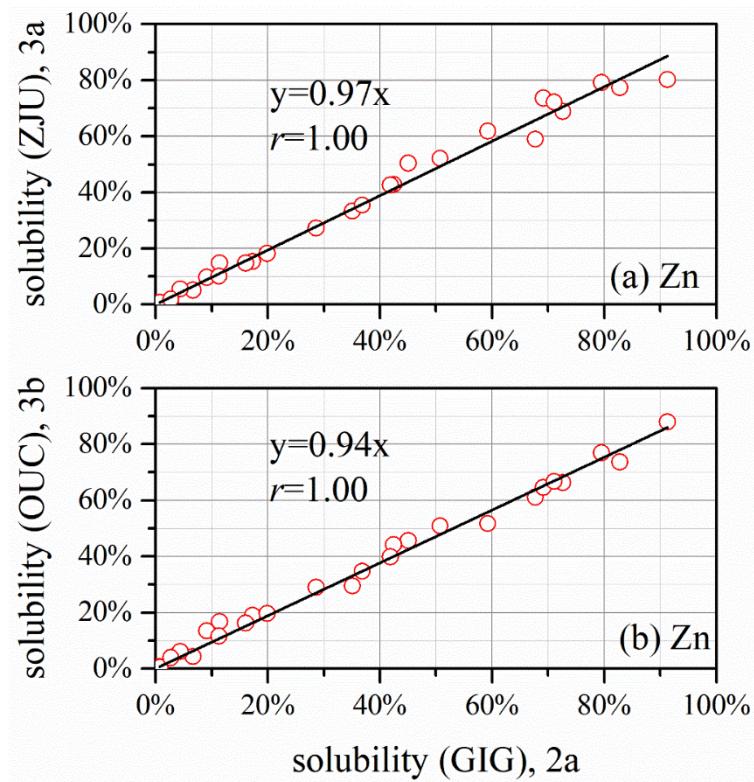
Figure S8. Solubilities of Zn determined using the GIG protocol versus those determined using

(a) the ZJU protocol and (b) the OUC protocol.