

SUPPLEMENTARY MATERIALS: EPMA METHODOGOLOY

Table S1. EPMA setup for analysis

Element and Line	Diffracting Crystal (Sp#)	Background type/fit	kV/nA/spot size(μm)	Peak Count Time	Bkgd Count Times (per pt)		# bkgd points acquired (Lo/Hi)	Standards*		Average DL (99% CI) on sample (ppm)
					Lo	Hi		Primary Standard	Interference Standards	
S Ka	LPET (1)	Multipoint	20/20/0	15	10	10	2/2	566	584	120
Bi Ma	LPET (1)	Multipoint	20/20/0	15	10	10	2/2	1400	582/584	640
Pb Ma	LPET (1)	Multipoint	20/20/0	15	10	10	2/2	566	530/798	660
Cd La	LPET (1)	Multipoint	20/20/0	30	15	15	0/3	561	530/732/778	560
Se La	TAP (2)	Multipoint	20/20/0	30	15	15	1/2	568	581/585/790/798/800	370
As La	TAP (2)	Multipoint	20/20/0	30	15	15	3/0	562	530/585/790/798	430
Fe Ka	LLIF (3)	Multipoint	20/20/0	30	15	15	2/2	556	582	240
Mn Ka	LLIF (3)	Multipoint	20/20/0	30	15	15	1/1	557	800	270
Cu Ka	LLIF (3)	Multipoint	20/20/0	15	10	10	1/1	556		390
Te La	LPET (4)	Multipoint	20/20/0	30	15	15	0/3	1400	581/582/584/585/732	350
Sb La	LPET (4)	Multipoint	20/20/0	30	15	15	1/3	544	790/798	370
Ag La	LPET (4)	Multipoint	20/20/0	20	10	10	1/1	560	557	750
Zn Ka	LLIF (5)	Multipoint	20/20/0	30	15	15	1/1	564		300
Au La	LLIF (5)	Multipoint	20/20/0	70	35	35	1/1	584	564	650

\* Standard # refers to internal database. Full list of standards in Table S3

Table S2. Interference corrections

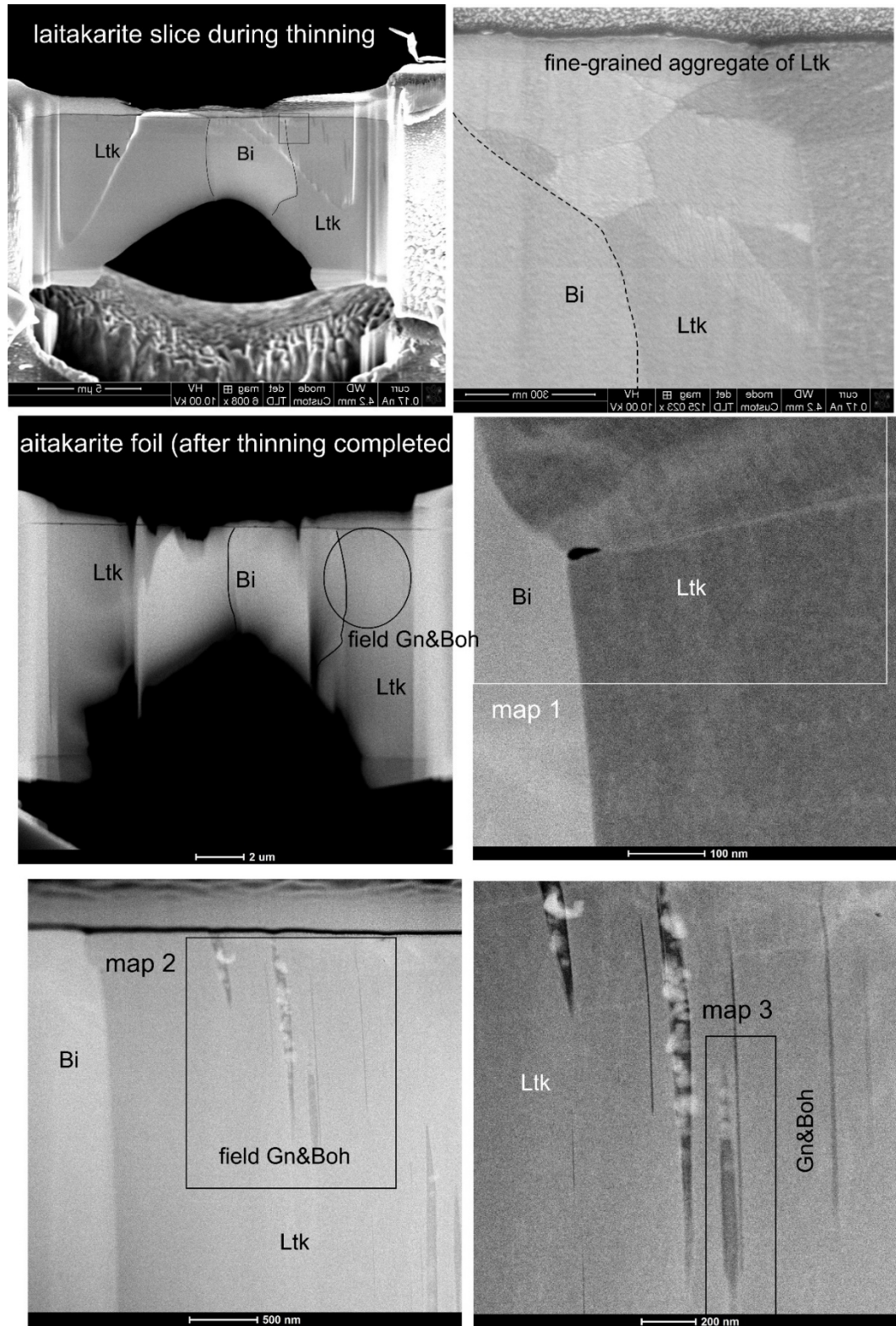
Element and Line	Diffracting Crystal (Sp#)	Standards*		Overlapping element and order/interference correction standard									
		Primary Standard	Interference Standards	Interfering line	Int. std	Interfering line	Int. std	Interfering line	Int. std	Interfering line	Int. std	Interfering line	Int. std
S Ka	LPET (1)	566	584	Au LB3 (V)	584								
Bi Ma	LPET (1)	1400	582/584	Pb Mb (I)	582	Au LA1 (IV)	584						
Pb Ma	LPET (1)	566	530/798	Fe KB1 (III)	530	Bi LI (IV)	798						
Cd La	LPET (1)	561	530/732/778	Fe KA1 (II)	530	Ag LB1	732	Se KB1 (IV)	778				
Se La	TAP (2)	568	581/585/790/798/800	Cd LI (II)	581	Sb LB2 (III)	585	Te LB3 (III)	790	Bi MG (II)	798	As LB3	800
As La	TAP (2)	562	530/585/790/798	Fe KA1 (V)	530	Sb LB4 (III)	585	Te LA1 (III)	790	Bi MB (II)	798		
Fe Ka	LLIF (3)	556	582	Pb LB3 (II)	582								
Mn Ka	LLIF (3)	557	800	As KB1 (II)	800								
Cu Ka	LLIF (3)	556											
Te La	LPET (4)	1400	581/582/584/585/732	Cd LG1	581	Pb LG1 (IV)	582	Au LB4 (III)	584	Sb LB1	585	Ag LG3	732
Sb La	LPET (4)	544	790/798	Te Ln	790	Bi LA1 (III)	798						
Ag La	LPET (4)	560	557	Mn SKA3 (II)	557								
Zn Ka	LLIF (5)	564											
Au La	LLIF (5)	584	564	Zn KB1	564								

\* Standard # refers to internal database. Full list of standards in Table S3

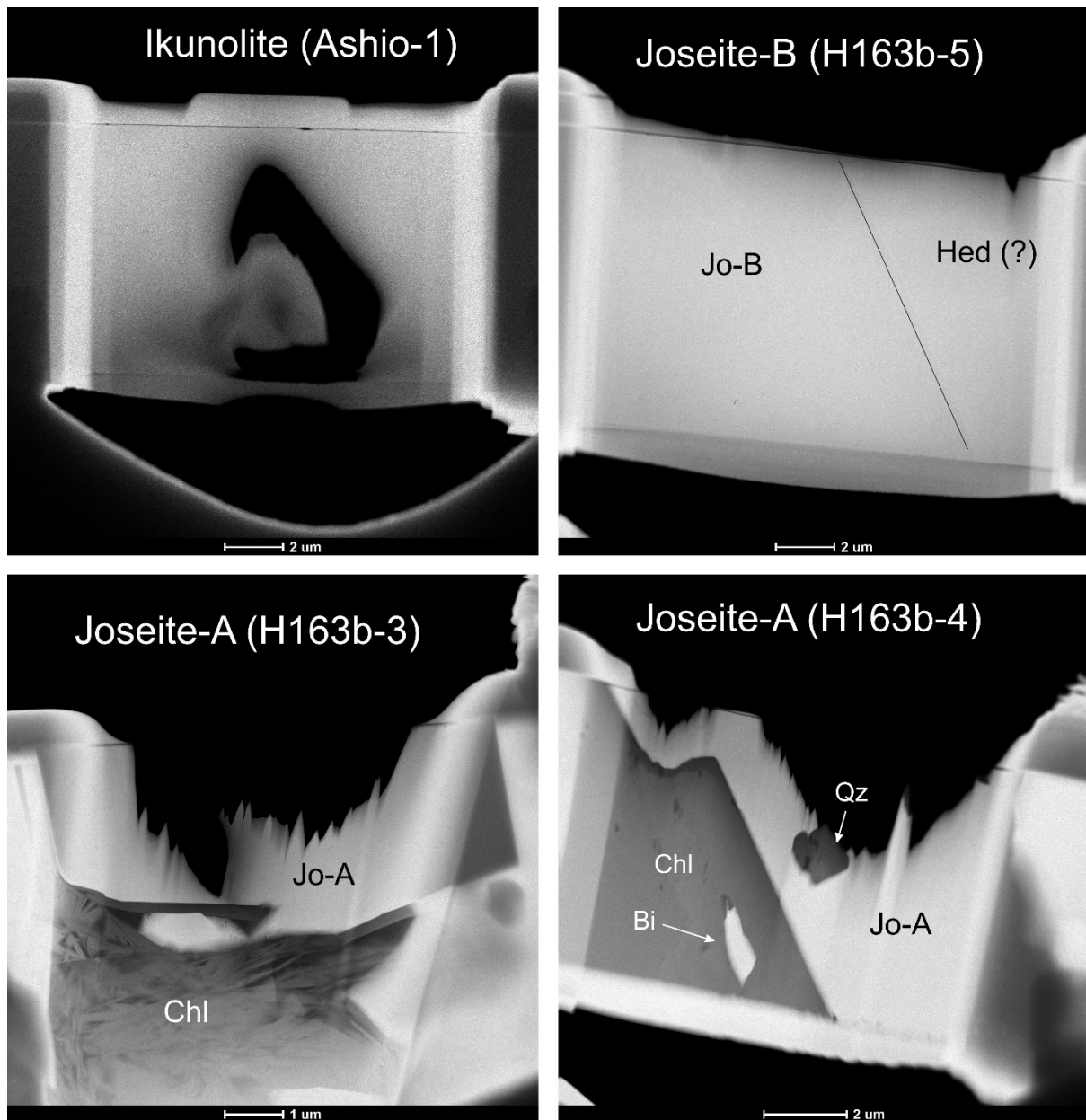
**Table S3.** Standard information

<b>Reference #</b>	<b>Mineral composition</b>	<b>Natural/Synthetic</b>	<b>Manufacturer</b>
530	Marcasite	Natural	Astimex
544	Stibnite	Natural	Astimex
556	Chalcopyrite	Natural	P&H and Associates
557	Rhodonite	Natural	P&H and Associates
560	Silver Telluride	Synthetic	P&H and Associates
561	Greenockite	Natural	P&H and Associates
562	Gallium Arsenide	Synthetic	P&H and Associates
564	Sphalerite	Natural	P&H and Associates
566	Galena	Natural	P&H and Associates
568	Bismuth Selenide	Synthetic	P&H and Associates
581	Cadmium metal	Synthetic	Astimex
582	Lead metal	Synthetic	Astimex
584	Gold	Synthetic	Astimex
585	Antimony metal	Synthetic	Astimex
732	Silver metal	Synthetic	C.M. Taylor
778	Selenium metal	Synthetic	C.M. Taylor
790	Tellurium metal	Synthetic	C.M. Taylor
798	Bismuth metal	Synthetic	C.M. Taylor
800	Indium Arsenide	Synthetic	C.M. Taylor
1400	Bismuth Telluride	Synthetic	P&H and Associates

## SUPPLEMENTARY MATERIALS: FIGURES



**Figure S1.** Secondary electron (top) and HAADF STEM images (middle and bottom) showing aspects of the laitarite foil (Ltk). Location of maps in Figures 5A, B and 11 are marked as Map1-3. Bi-native bismuth; Boh-bohdanowiczite; Gn-galena.



**Figure S2.** HAADF STEM images showing aspects of the foils studied for: ikunolite, joséite-B (Jo-B) and joséite-A (Jo-A). Bi-native bismuth; Chl-chlorite; Hed-hedleyite; Qz-quartz.