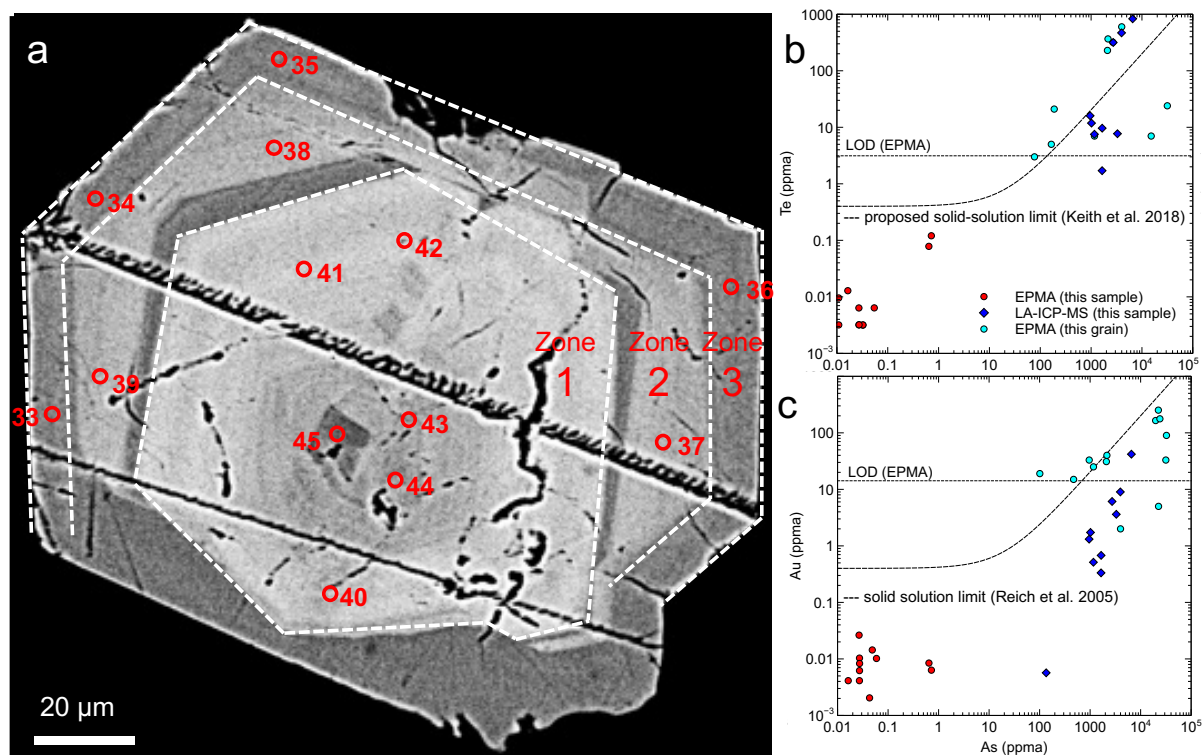


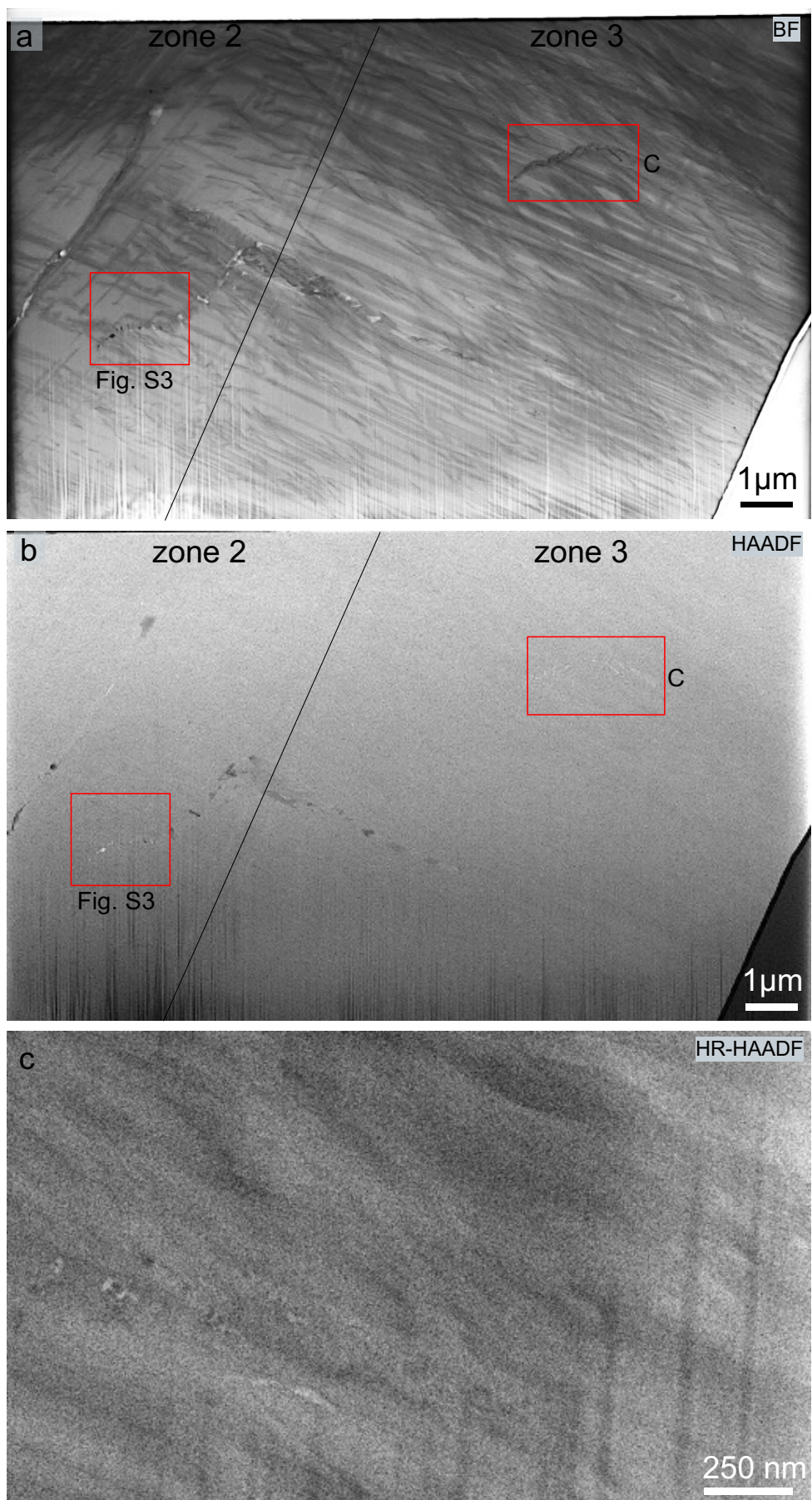
Supplementary material



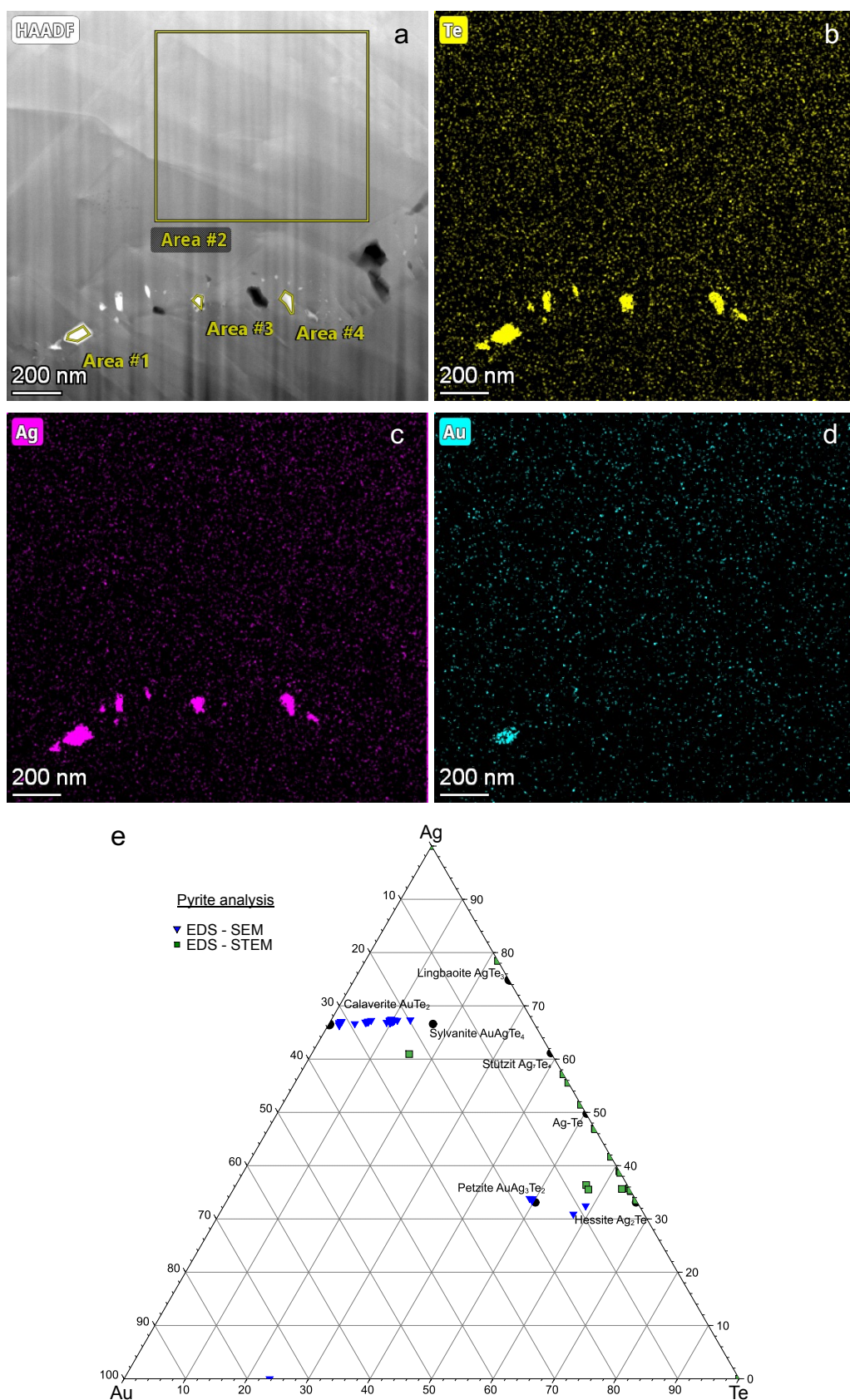
Supplementary Figure 1: a) Backscattered electron (BSE) image of the investigated pyrite, with corresponding zones and points of wavelength dispersive X-ray spectroscopy (WDX) analysis in Table S1. b, c) compilation of the electron probe microanalysis (EPMA) results in Supplementary Table 1, the surrounding pyrites as well as the Laser Ablation – Inductively Coupled Plasma – Mass Spectrometry (LA-ICP-MS) results in the surrounding pyrites.

Supplementary Table 1: Electron microprobe analysis, corresponding to the spots in Fig. S1

	No.	S at.%	Fe at.%	As at.%	Cu [ppma]	Ag [ppma]	Au [ppma]	Te [ppma]
Zone 3	33	65.98	33.55	0.40	40.64	33.90	0	601.9
	34	67.02	32.46	0.21	2895	7.32	30.07	229.0
	35	66.00	33.22	0.27	4732	15.03	0	317.6
	36	66.20	33.27	0.21	2690	0	40.75	364.8
Zone 2	37	64.00	33.69	2.26	488.9	0	0	0
	38	64.60	33.82	1.52	665.4	0	0	0
	39	65.04	33.43	1.52	113.8	0	0	6.30
Zone 1	43	63.44	33.57	2.99	77.51	0	0	0
	44	63.34	33.36	3.25	484.6	0	89.64	0
	45	63.15	33.63	3.16	577.0	0	33.47	22.60
	40	64.17	33.47	2.24	939.4	0	251.1	0
	41	64.55	33.36	1.98	970.4	0	165.8	0
	42	64.01	33.47	2.41	906.8	0	176.3	0



Supplementary Figure 2: a) Bright field (BF) image of transmission electron microscopy (TEM) lamella before thinning b) High-angle annular dark field (HAADF) image of TEM lamella before thinning c) High resolution high-angle annular dark field (HR-HAADF) area marked in A and B after thinning the TEM lamella from ~220nm to ~100nm.



Supplementary Figure 3: Scanning transmission electron microscopy (STEM) images, respective energy dispersive X-ray spectroscopy (EDX) analysis areas of Table S3 are marked area#1 to area#4 a) High-angle annular dark field (HAADF) image b) EDX mapping Te c) EDX mapping Ag d) EDX mapping Au e) ternary plot with free tellurides, measured in the samples via EDX by Börner et al. (2021) (blue triangles) and the atomic compositions of telluride inclusions measured via STEM-EDX within pyrite (green boxes), both normed to 100 at. %.

Supplementary Table 2: Energy dispersive X-ray spectroscopy analysis results of the marked areas in Supplementary Figure 3; matrix in Fig. 5f; matrix in Fig. 2d, all in at. %. σ = standard deviation

	S (at. %)	Fe (at. %)	As (at. %)	Ag (at. %)	Te (at. %)	Au (at. %)	Σ (Ag, Te, Au)
area #1	45.1	38.2	1.3	8.89	5.47	1.04	15.4
σ	4.39	6.28	0.24	1.33	0.81	0.16	2.3
area #2	56.23	41.87	1.91				
σ	6.64	7.43	0.34				
area #3	51.25	38.57	1.45	5.33	3.4		
σ	5.28	6.46	0.29	0.83	0.53		
area #4	52.5	40.49	1.84	3.35	1.82		
σ	5.69	6.93	0.33	0.53	0.29		
matrix in Fig. 5 f	63.13	36.41	0.34	0.07	0.05		
σ	6.73	6.19	0.06	0.01	0.01		
matrix in Fig. 2d (right)	63.35	36.37	0.18	0.04	0.05		
σ	6.76	6.18	0.03	0.01	0.01		
matrix in Fig. 2d (left)	61.86	37.97	0.1	0.03	0.04		
σ	6.83	6.55	0.02	0	0.01		