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**Supporting information for article:**

**Investigation of micrometeoritic materials at the new hard X-ray imaging  
PUMA beamline for heritage sciences**

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**Table 1. Detection limits after 1000s acquisition time at 18 keV illumination with detector in near position. Empty cells correspond to non-detected or non-certified elements.**

Z	Line	NIST 613		NIST 1577c		ATHO-G	
		DL ( $\mu\text{g/g}$ )	Uncert. ( $\mu\text{g/g}$ )	DL ( $\mu\text{g/g}$ )	Uncert. ( $\mu\text{g/g}$ )	DL ( $\mu\text{g/g}$ )	Uncert. ( $\mu\text{g/g}$ )
13	K	8.69E+02	3.73E+01			0.00E+00	0.00E+00
14	K	7.25E+02	1.90E+01			9.83E+02	2.82E+01
15	K			1.82E+03	1.47E+02	1.32E+02	3.78E+00
16	K			1.14E+02	5.65E+00		
17	K			2.20E+01	1.11E+00		
19	K			1.77E+00	2.38E-01	3.34E+00	2.99E-01
20	K	2.68E+00	3.72E-01	4.28E-01	3.48E-02	3.51E+00	1.46E-01
22	K	1.45E+00	9.43E-02			1.22E+00	1.29E-01
23	K	7.23E-01	6.98E-02	2.00E-04	1.66E-05		
24	K	5.89E-01	2.24E-01				
25	K	2.94E-01	7.84E-03	6.56E-02	3.23E-03	3.55E-01	2.24E-02
26	K	2.01E-01	8.00E-03	4.75E-02	4.36E-03	2.42E-01	2.76E-02
27	K	1.29E-01	4.41E-03				
28	K	1.04E-01	8.16E-04			1.59E-01	6.10E-02
29	K	9.30E-02	2.28E-03	2.27E-02	3.67E-03	1.00E-01	1.19E-02
30	K	8.91E-02	9.08E-03	1.95E-02	2.87E-03	8.55E-02	9.16E-03
31	K	6.44E-02	3.63E-03			7.64E-02	7.27E-03
32	K	6.51E-02	4.98E-03				
33	K	6.98E-02	1.23E-02				
34	K			9.05E-03	3.47E-04		
35	K					5.04E-03	1.26E-03
37	K	1.46E-02	5.39E-04	1.27E-02	1.09E-03	2.43E-02	1.21E-03
38	K	1.89E-02	8.53E-04	4.18E-03	2.10E-04	3.22E-02	1.06E-03
39	K	3.10E-02	1.77E-03			4.06E-02	1.56E-03
57	L	2.55E+00	1.78E-01				
58	L					5.84E-01	1.98E-02
62	L	8.18E-01	5.95E-02				
64	L	1.28E+00	4.35E-02				
67	L	5.66E-01	1.71E-02				
69	L	2.63E-01	8.87E-03				
71	L	2.72E-01	1.41E-02				
74	L	1.79E-01	3.64E-03				
81	L	1.86E-01	3.80E-03				
82	L	8.96E-02	6.85E-04	4.72E-03	2.07E-04	2.58E-02	2.82E-03
83	L	7.03E-02	1.41E-02				
90	L	1.07E-01	1.25E-03				

**Table 2. Detection limits after 1000s acquisition time at 18 keV illumination with detector in confocal mode. Empty cells correspond to non-detected or non-certified elements.**

Z	Line	NIST 613		NIST 1577c		ATHO-G	
		DL ( $\mu\text{g/g}$ )	Uncert. ( $\mu\text{g/g}$ )	DL ( $\mu\text{g/g}$ )	Uncert. ( $\mu\text{g/g}$ )	DL ( $\mu\text{g/g}$ )	Uncert. ( $\mu\text{g/g}$ )
13	K						
14	K	1.55E+03	1.15E+02			1.30E+03	1.30E+02
15	K			1.14E+02	1.99E+01		
16	K			2.13E+01	6.88E+00		
17	K			8.80E+00	2.80E+00	2.88E+02	1.86E+01
19	K			1.79E+00	2.32E+00	3.78E+00	7.42E-01
20	K	4.71E+00	1.48E+00	7.30E-01	1.86E-01	4.05E+00	6.69E-01
22	K	2.61E+00	1.84E-01			1.50E+00	2.10E-01
23	K	1.28E+00	1.26E-01				
24	K	1.33E+00	5.05E-01				
25	K	7.76E-01	2.62E-02	3.08E-01	5.01E-02	7.32E-01	8.55E-02
26	K	6.98E-01	3.15E-02	2.33E-01	1.90E-01	6.81E-01	3.91E-01
27	K	4.97E-01	2.06E-02				
28	K	5.00E-01	1.29E-02			7.21E-01	2.78E-01
29	K	6.16E-01	2.20E-02	1.54E-01	3.33E-01	5.47E-01	6.69E-02
30	K	6.51E-01	6.89E-02	1.43E-01	3.54E-01	5.69E-01	7.30E-02
31	K	5.07E-01	3.37E-02	4.46E-02	2.20E-01	6.83E-01	7.05E-02
32	K	6.01E-01	5.16E-02				
33	K	5.90E-01	1.08E-01				
35	K					3.94E-01	1.22E-01
37	K	2.64E-01	1.83E-01			3.61E-01	1.93E-01
38	K	6.15E-01	3.65E-01			7.29E-01	2.78E-01
39	K	1.25E+00	2.25E-01	5.77E-02	3.94E-02	1.07E+00	2.61E-01
57	L	4.68E+00	4.22E-01				
58	L					8.30E-01	4.13E-02
62	L	2.37E+00	1.91E-01				
64	L	4.36E+00	2.95E-01				
67	L	2.41E+00	1.12E-01				
69	L	1.31E+00	5.53E-02				
71	L	2.04E+00	1.26E-01				
74	L	2.07E+00	8.16E-02				
78	L						
81	L	2.24E+01	1.53E+01				
82	L	2.03E+00	9.31E-02			4.81E-01	6.06E-02
83	L	1.23E+00	2.54E-01				

**Table 3. Detection limits after 1s acquisition time at 18 keV illumination with detector in near position. Empty cells correspond to non-detected or non-certified elements.**

Z	Line	NIST 613		NIST 1577c		ATHO-G	
		DL (μg/g)	Uncert. (μg/g)	DL (μg/g)	Uncert. (μg/g)	DL (μg/g)	Uncert. (μg/g)
13	K	2.75E+04	1.18E+03				
14	K	2.29E+04	6.01E+02			3.11E+04	8.91E+02
15	K			5.74E+04	4.66E+03	4.18E+03	1.20E+02
16	K			3.62E+03	1.79E+02		
17	K			6.96E+02	3.50E+01		
19	K			5.61E+01	7.52E+00	1.06E+02	9.45E+00
20	K	8.47E+01	1.18E+01	1.35E+01	1.10E+00	1.11E+02	4.60E+00
22	K	4.60E+01	2.98E+00			3.87E+01	4.09E+00
23	K	2.29E+01	2.21E+00	6.32E-03	5.23E-04		
24	K	1.86E+01	7.09E+00				
25	K	9.28E+00	2.48E-01	2.07E+00	1.02E-01	1.12E+01	7.08E-01
26	K	6.36E+00	2.53E-01	1.50E+00	1.38E-01	7.66E+00	8.72E-01
27	K	4.07E+00	1.40E-01				
28	K	3.29E+00	2.58E-02			5.01E+00	1.93E+00
29	K	2.94E+00	7.20E-02	7.19E-01	1.16E-01	3.18E+00	3.76E-01
30	K	2.82E+00	2.87E-01	6.16E-01	9.06E-02	2.70E+00	2.90E-01
31	K	2.04E+00	1.15E-01			2.42E+00	2.30E-01
32	K	2.06E+00	1.57E-01				
33	K	2.21E+00	3.88E-01				
34	K			2.86E-01	1.10E-02		
35	K					1.59E-01	3.99E-02
37	K	4.61E-01	1.71E-02	4.03E-01	3.43E-02	7.69E-01	3.82E-02
38	K	5.96E-01	2.70E-02	1.32E-01	6.65E-03	1.02E+00	3.34E-02
39	K	9.81E-01	5.60E-02			1.28E+00	4.93E-02
57	L	8.06E+01	5.64E+00				
58	L					1.85E+01	6.25E-01
62	L	2.59E+01	1.88E+00				
64	L	4.05E+01	1.38E+00				
67	L	1.79E+01	5.40E-01				
69	L	8.30E+00	2.81E-01				
71	L	8.60E+00	4.47E-01				
74	L	5.67E+00	1.15E-01				
81	L	5.89E+00	1.20E-01				
82	L	2.83E+00	2.17E-02	1.49E-01	6.54E-03	8.14E-01	8.92E-02
83	L	2.22E+00	4.46E-01				
90	L	3.40E+00	3.95E-02				

**Table 4. Detection limits after 1s acquisition time at 18 keV illumination with detector in near confocal mode. Empty cells correspond to non-detected or non-certified elements.**

Z	Line	NIST 613		NIST 1577c		ATHO-G	
		DL ( $\mu\text{g/g}$ )	Uncert. ( $\mu\text{g/g}$ )	DL ( $\mu\text{g/g}$ )	Uncert. ( $\mu\text{g/g}$ )	DL ( $\mu\text{g/g}$ )	Uncert. ( $\mu\text{g/g}$ )
13	K						
14	K	4.91E+04	3.64E+03			4.12E+04	4.13E+03
15	K			3.59E+03	6.31E+02		
16	K			6.73E+02	2.18E+02		
17	K			2.78E+02	8.84E+01	9.10E+03	5.89E+02
19	K			5.67E+01	7.34E+01	1.19E+02	2.35E+01
20	K	1.49E+02	4.68E+01	2.31E+01	5.89E+00	1.28E+02	2.11E+01
22	K	8.27E+01	5.83E+00			4.74E+01	6.65E+00
23	K	4.04E+01	3.99E+00				
24	K	4.19E+01	1.60E+01				
25	K	2.45E+01	8.27E-01	9.75E+00	1.58E+00	2.31E+01	2.70E+00
26	K	2.21E+01	9.97E-01	7.37E+00	5.99E+00	2.15E+01	1.24E+01
27	K	1.57E+01	6.51E-01				
28	K	1.58E+01	4.09E-01			2.28E+01	8.80E+00
29	K	1.95E+01	6.97E-01	4.86E+00	1.05E+01	1.73E+01	2.12E+00
30	K	2.06E+01	2.18E+00	4.54E+00	1.12E+01	1.80E+01	2.31E+00
31	K	1.60E+01	1.07E+00	1.41E+00	6.95E+00	2.16E+01	2.23E+00
32	K	1.90E+01	1.63E+00				
33	K	1.87E+01	3.43E+00				
35	K					1.25E+01	3.85E+00
37	K	8.34E+00	5.79E+00			1.14E+01	6.09E+00
38	K	1.95E+01	1.16E+01			2.30E+01	8.78E+00
39	K	3.96E+01	7.11E+00	1.82E+00	1.24E+00	3.39E+01	8.25E+00
57	L	1.48E+02	1.34E+01				
58	L					2.62E+01	1.31E+00
62	L	7.49E+01	6.04E+00				
64	L	1.38E+02	9.33E+00				
67	L	7.61E+01	3.56E+00				
69	L	4.15E+01	1.75E+00				
71	L	6.45E+01	3.98E+00				
74	L	6.55E+01	2.58E+00				
78	L						
81	L	7.09E+02	4.84E+02				
82	L	6.41E+01	2.94E+00			1.52E+01	1.92E+00
83	L	3.89E+01	8.03E+00				