

Stardust foil C2029W, 1

Broad, shallow and irregular patch of overlapped craters. Impact by a cluster of grains, probably more than 12? Mg silicate (probably Mg pyroxene), Ca-rich Mg silicate (probably clino-pyroxene), Fe and Ni-rich sulfides, C-rich material

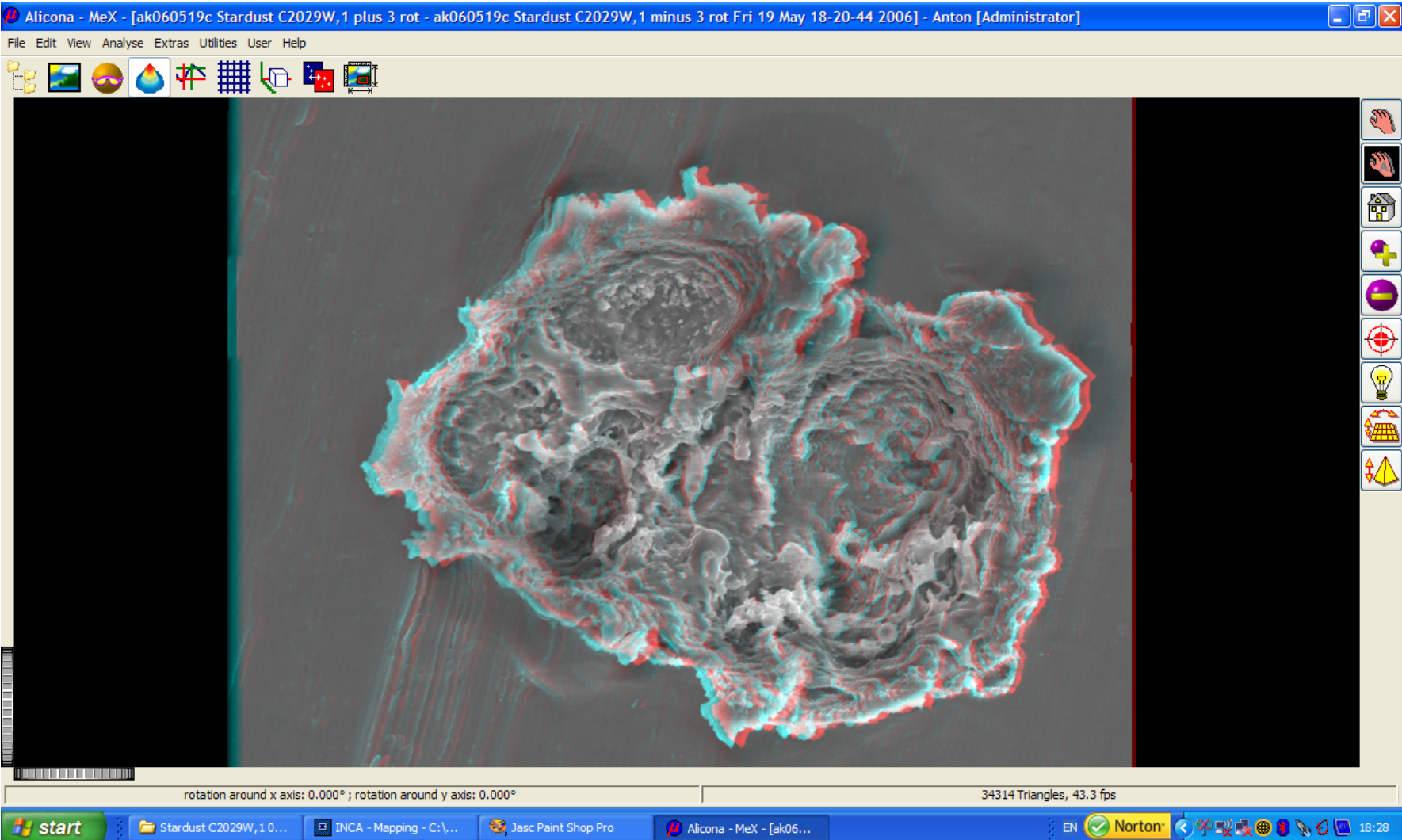
Electron imagery, Stereometric reconstruction, depth models and profiles, crater overlaps, X-ray maps.

Quantitative Energy Dispersive X-ray spectra

Anton Kearsley

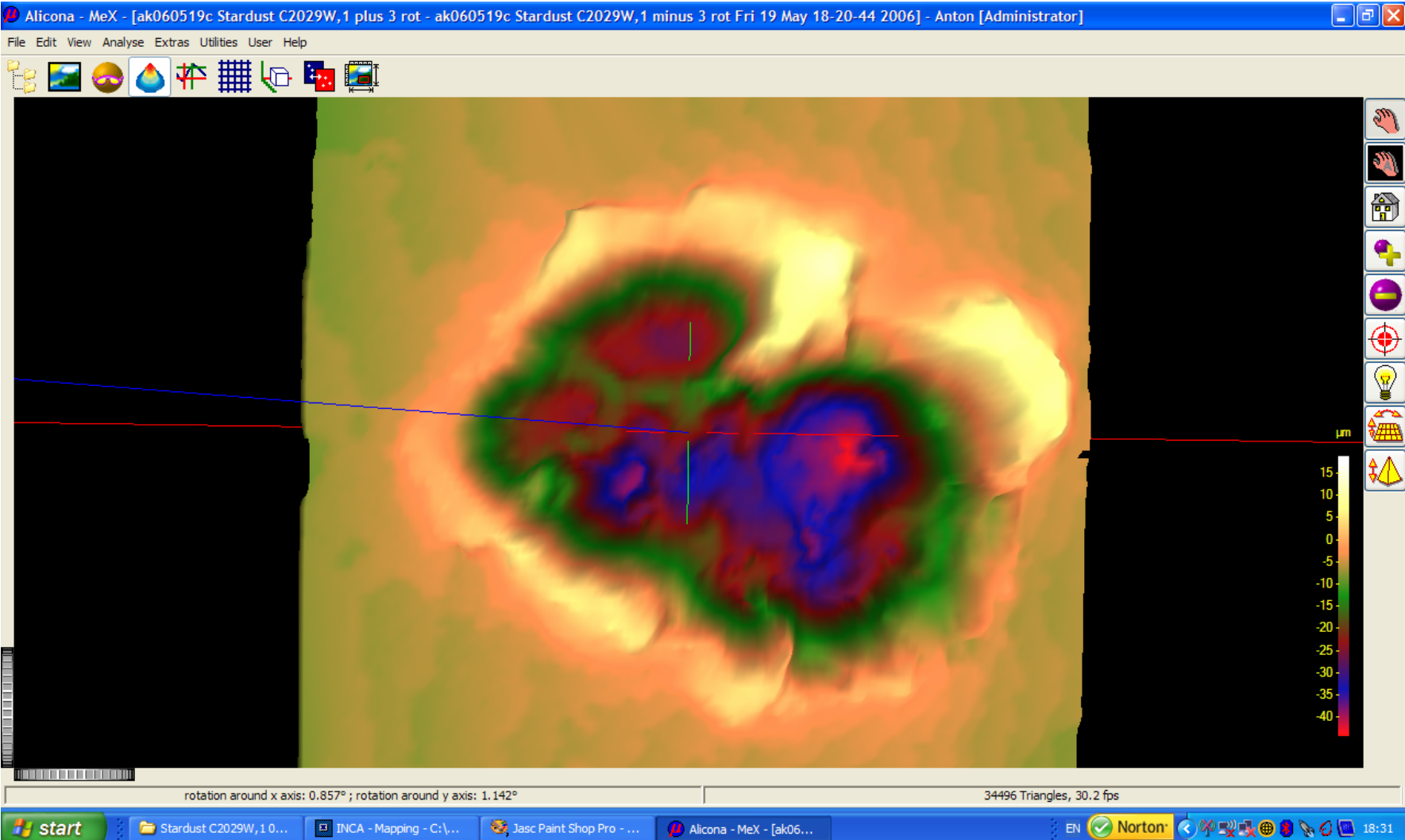
NHM 27th May 2006

Stardust foil C2029W,1 stereo anaglyph



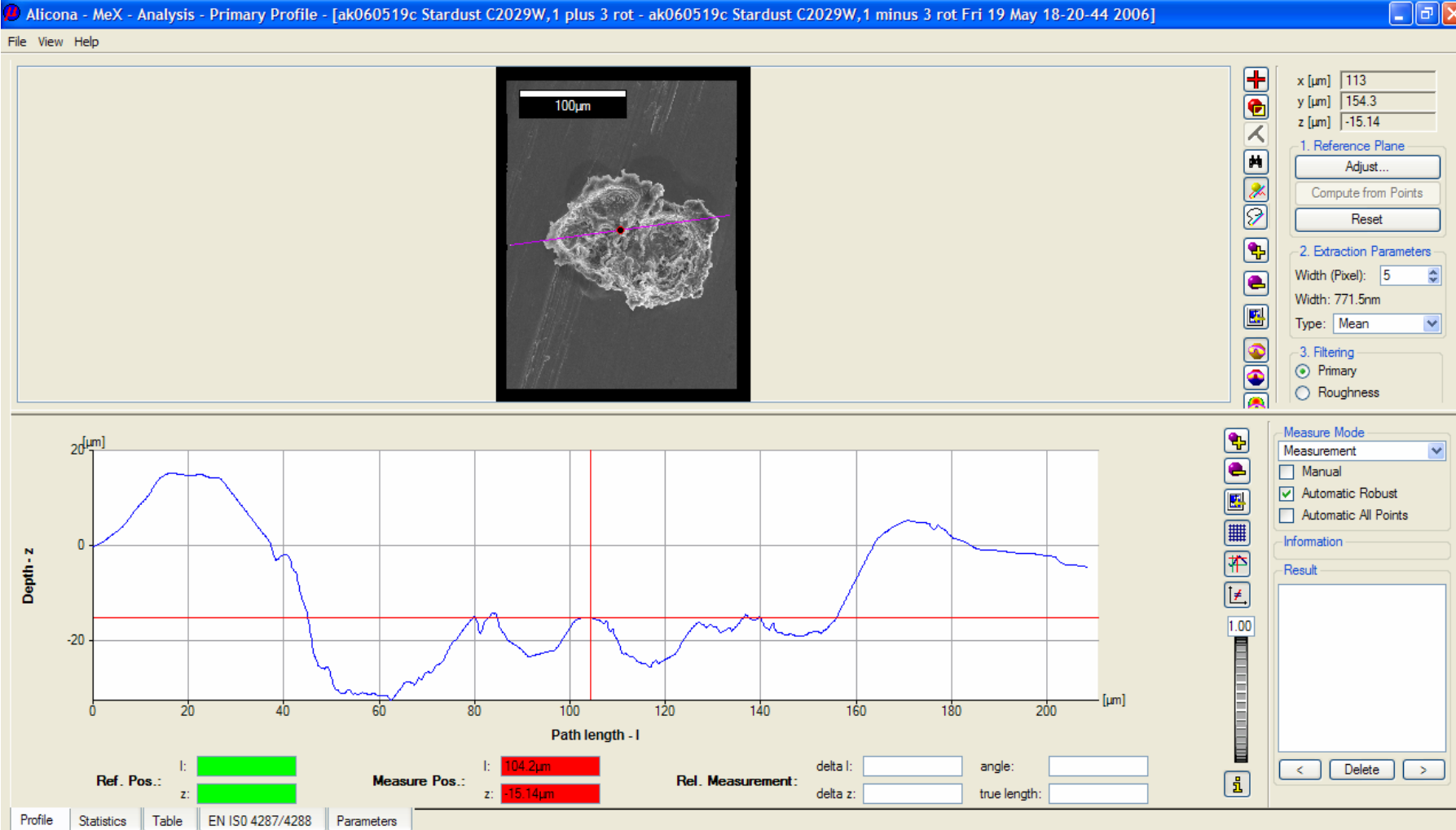
Stardust foil C2029W,1

depth model



Stardust foil C2029W, 1

depth profile 1

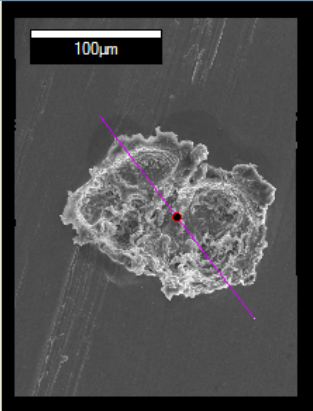


Stardust foil C2029W, 1

depth profile 2

Alicona - MeX - Analysis - Primary Profile - [ak060519c Stardust C2029W,1 plus 3 rot - ak060519c Stardust C2029W,1 minus 3 rot Fri 19 May 18-20-44 2006]

File View Help

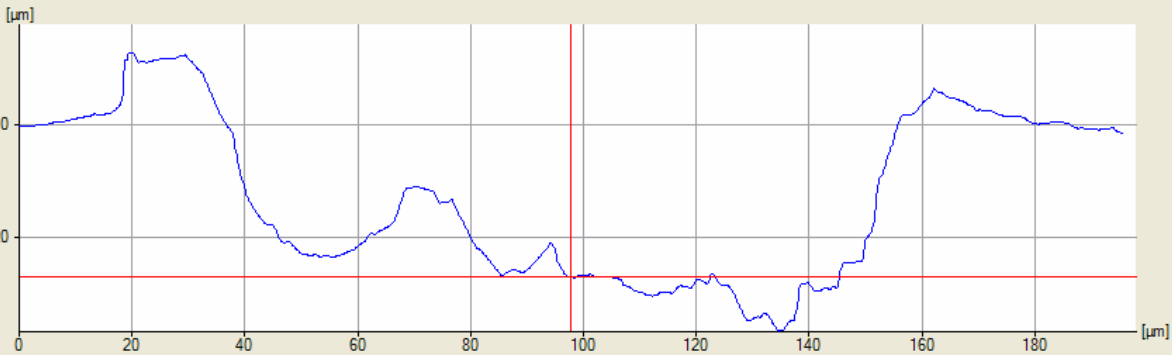


x [µm] 130.8
y [µm] 166.4
z [µm] -27.02

1. Reference Plane
Adjust...
Compute from Points
Reset

2. Extraction Parameters
Width (Pixel): 5
Width: 154.3nm
Type: Mean

3. Filtering
 Primary
 Roughness



Depth - z [µm]

Path length - l [µm]

Ref. Pos.: l: [redacted] z: [redacted]

Measure Pos.: l: 97.75µm z: -27.02µm

Rel. Measurement: delta l: [redacted] angle: [redacted] delta z: [redacted] true length: [redacted]

Profile Statistics Table EN ISO 4287/4288 Parameters

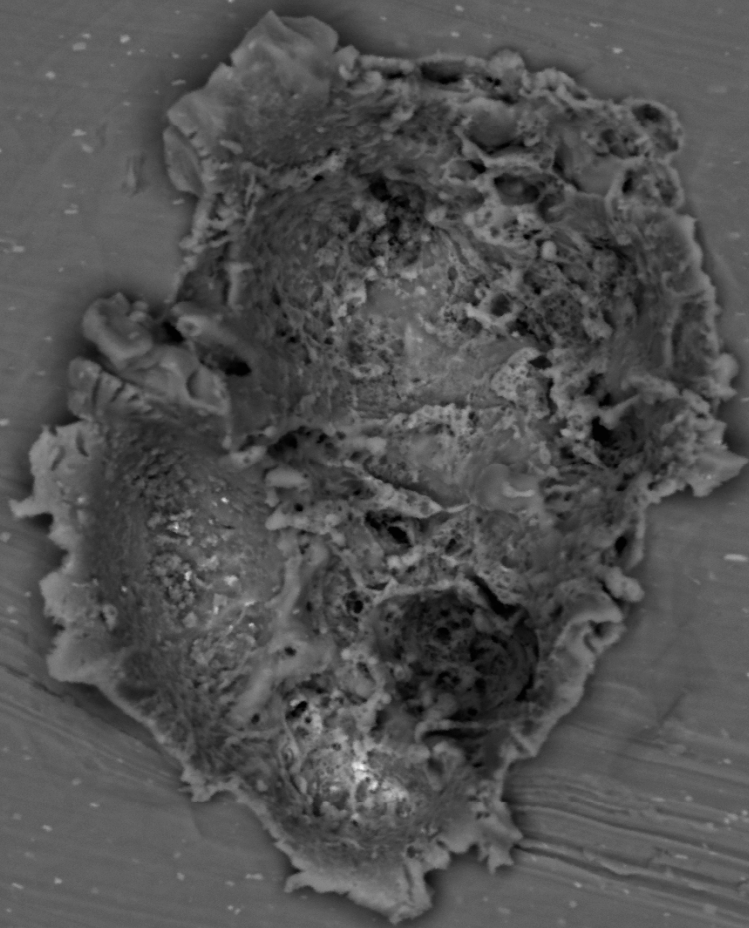
Measure Mode
Measurement
 Manual
 Automatic Robust
 Automatic All Points
Information
Result

1.00

start Stardust C2029W, 1 0... INCA - Mapping - C:\... Jasc Paint Shop Pro - ... Alicona - MeX - [ak06... Alicona - MeX - Analy... EN Norton 18:33

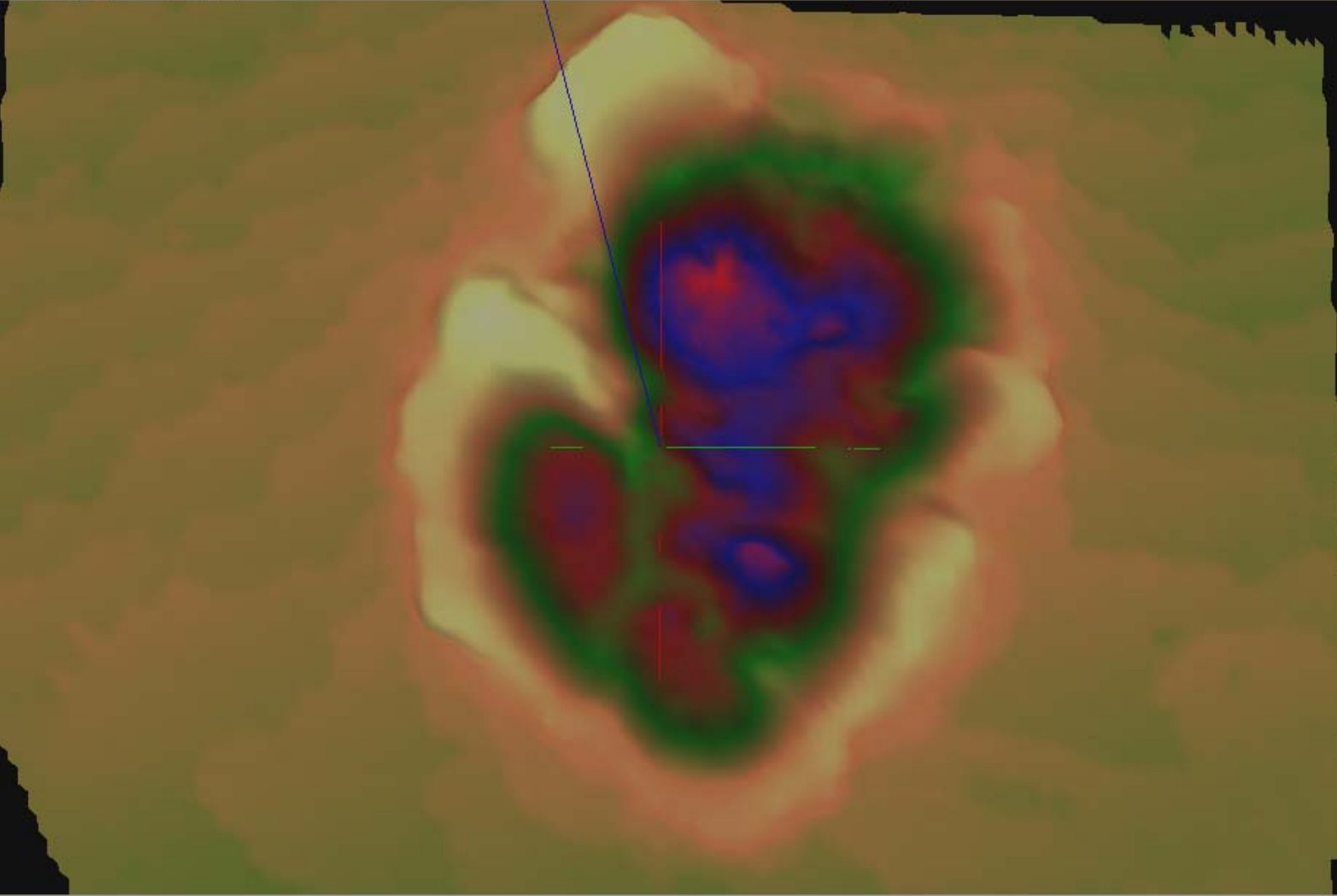
BEI

C2029W,1



100 μm

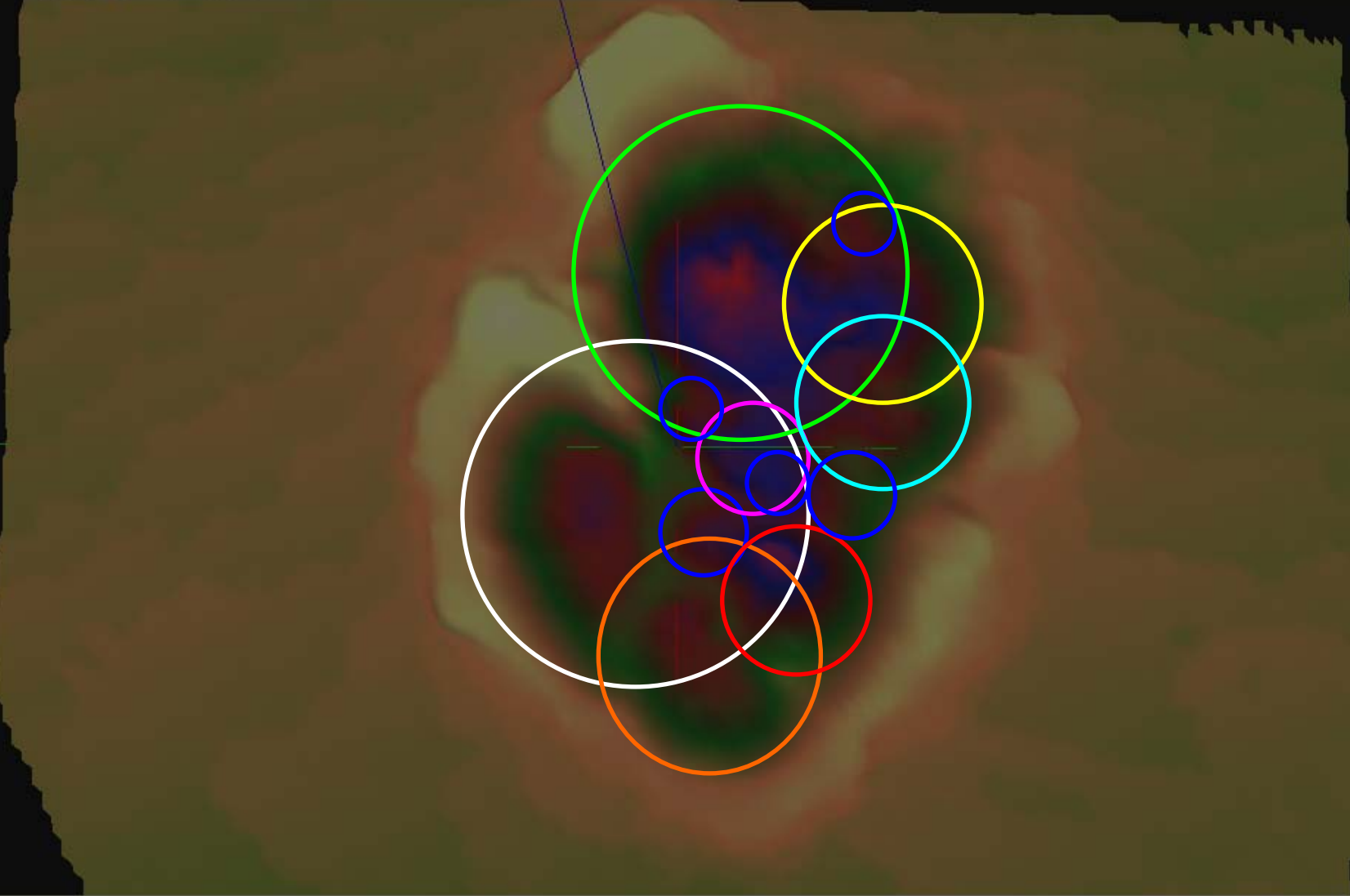




Subrang
+
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40

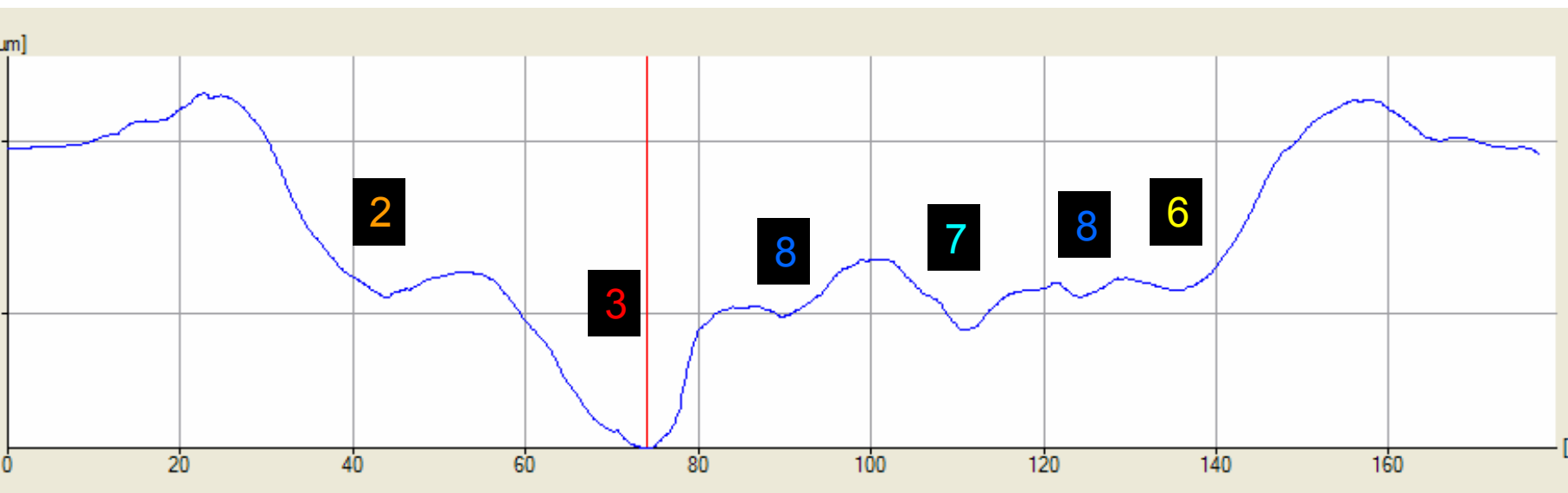
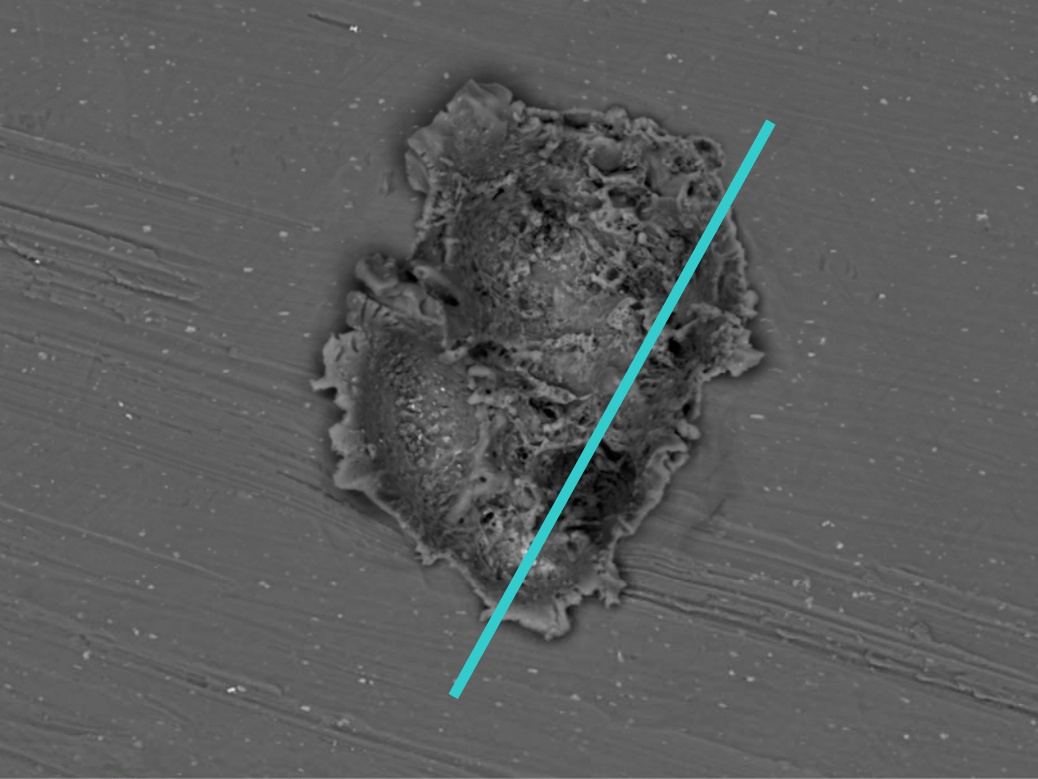
rotation around x axis: 89.752° ; rotation around y axis: 89.727°

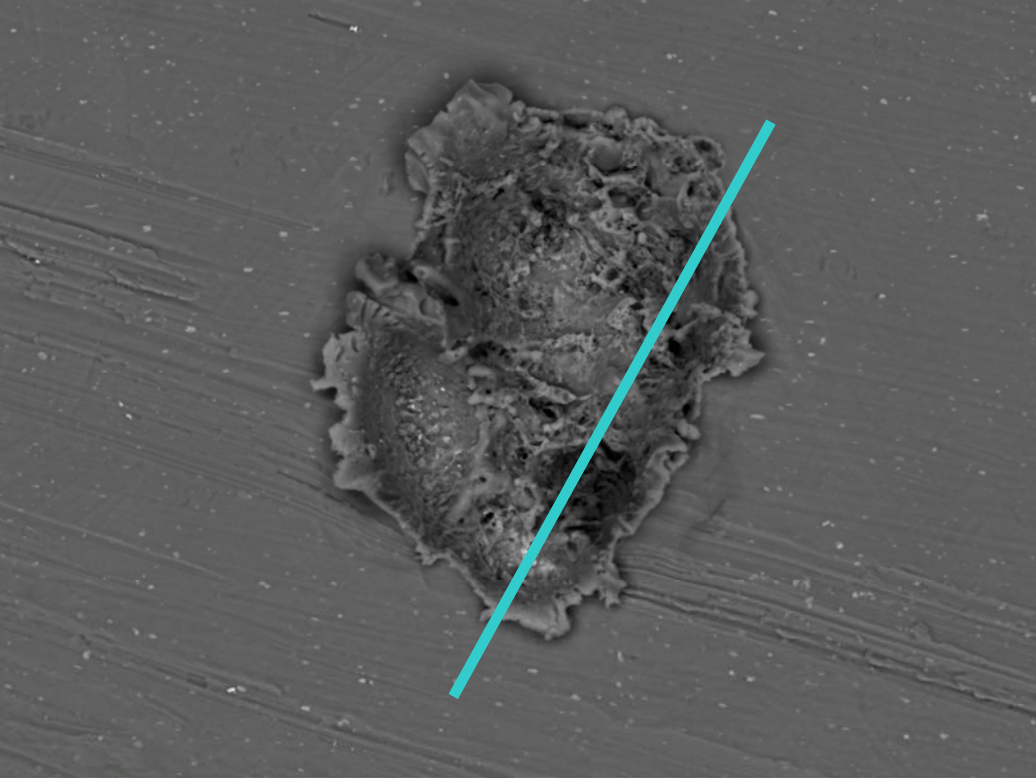
32393 Triangles, 29.8 fps



rotation around x axis: 89.752° ; rotation around y axis: 89.727°

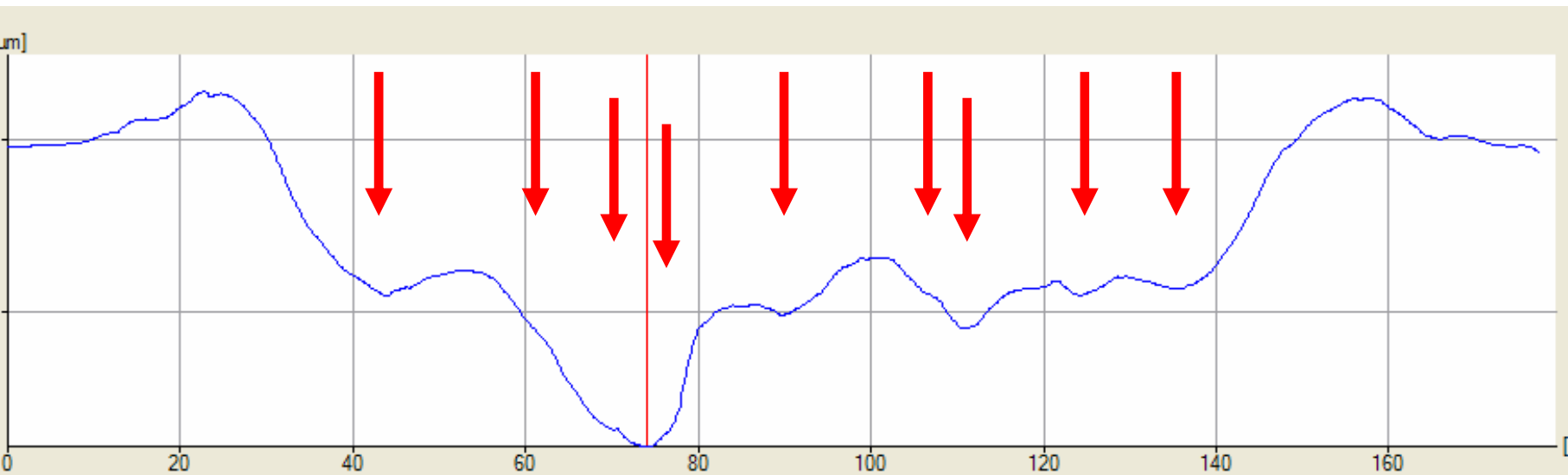
32393 Triangles, 29.8 fps





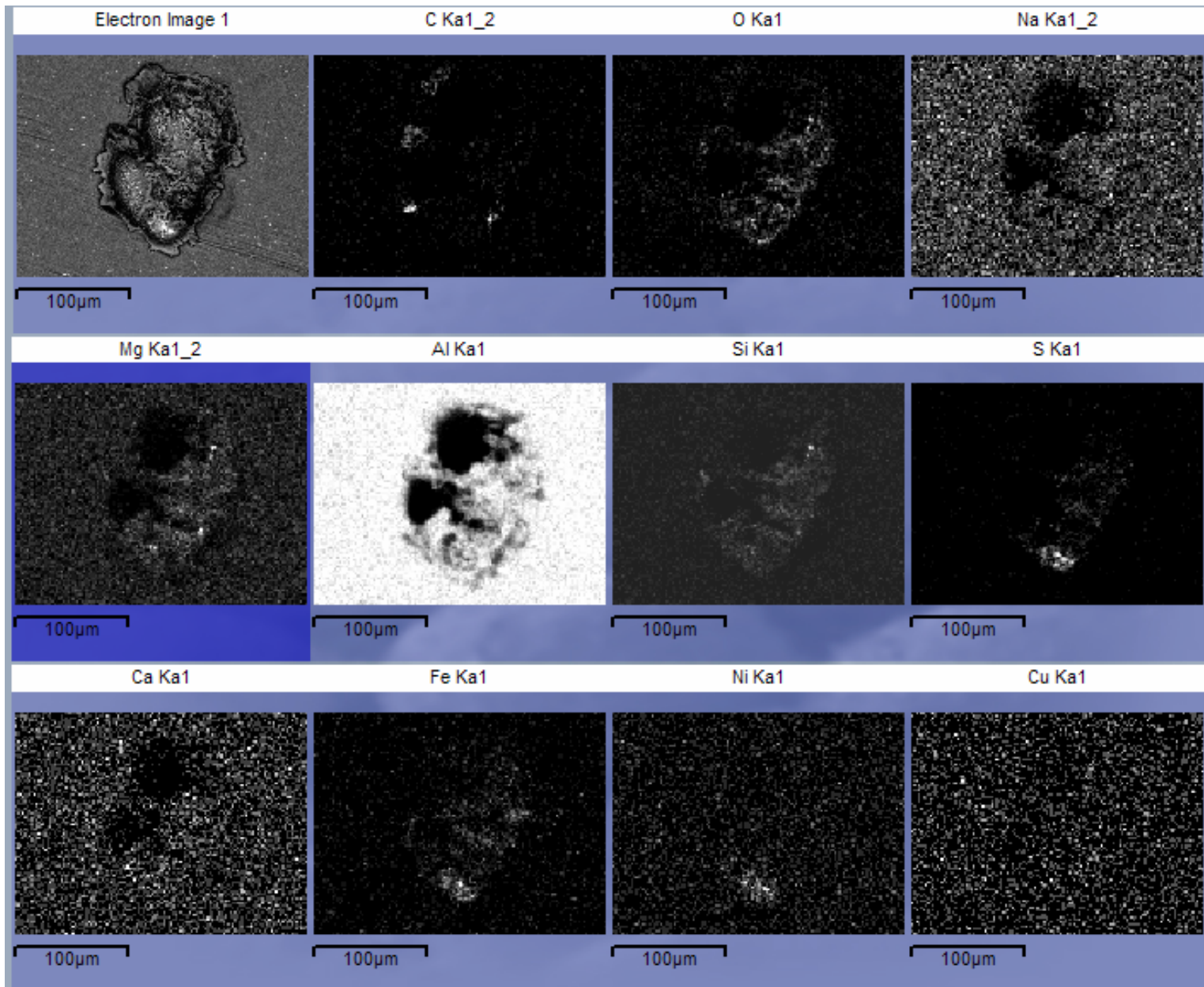
Stardust C2029N,1

Line profile reveals numerous impact centres in complex crater field



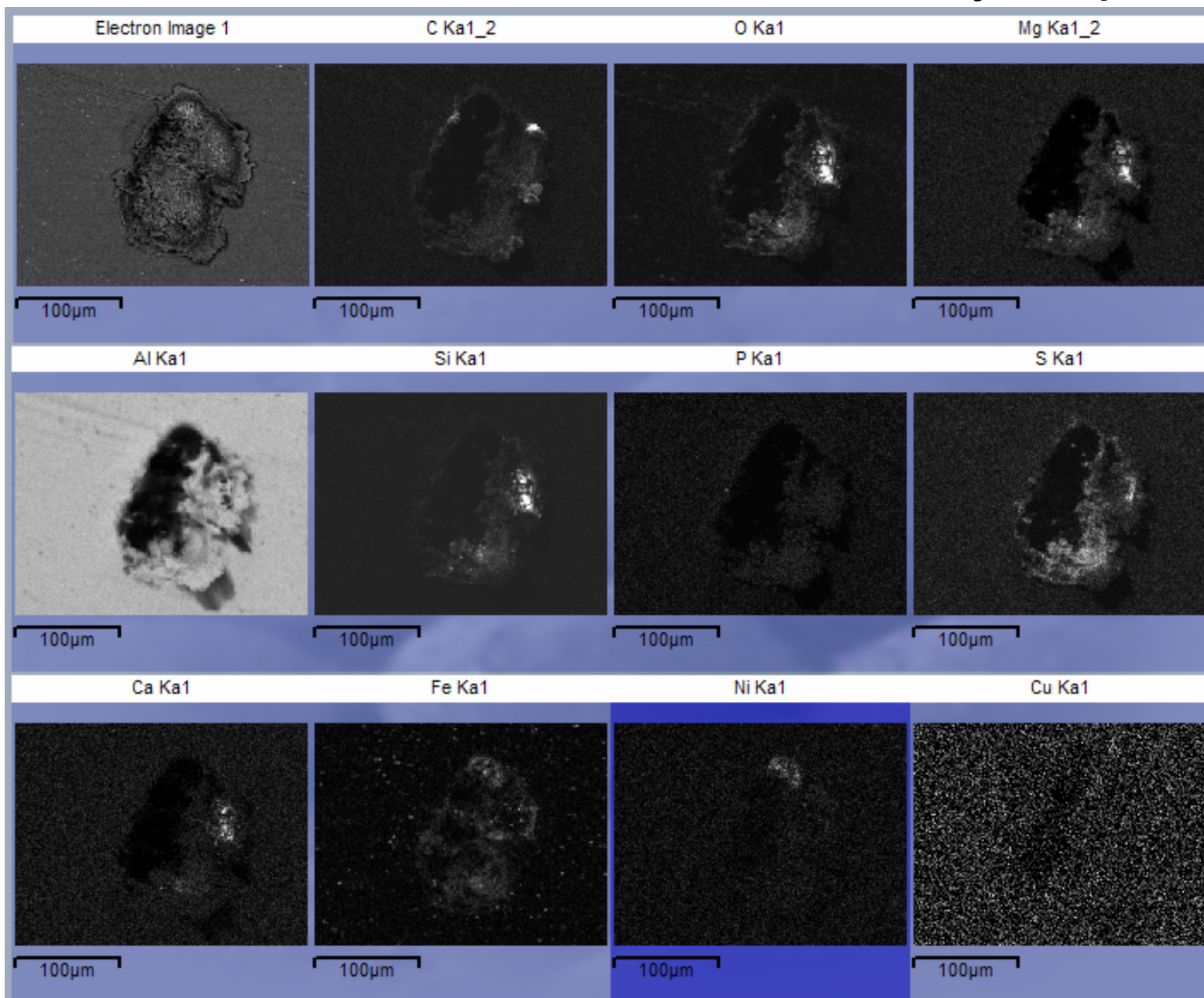
Stardust foil C2029W,1

X-ray maps



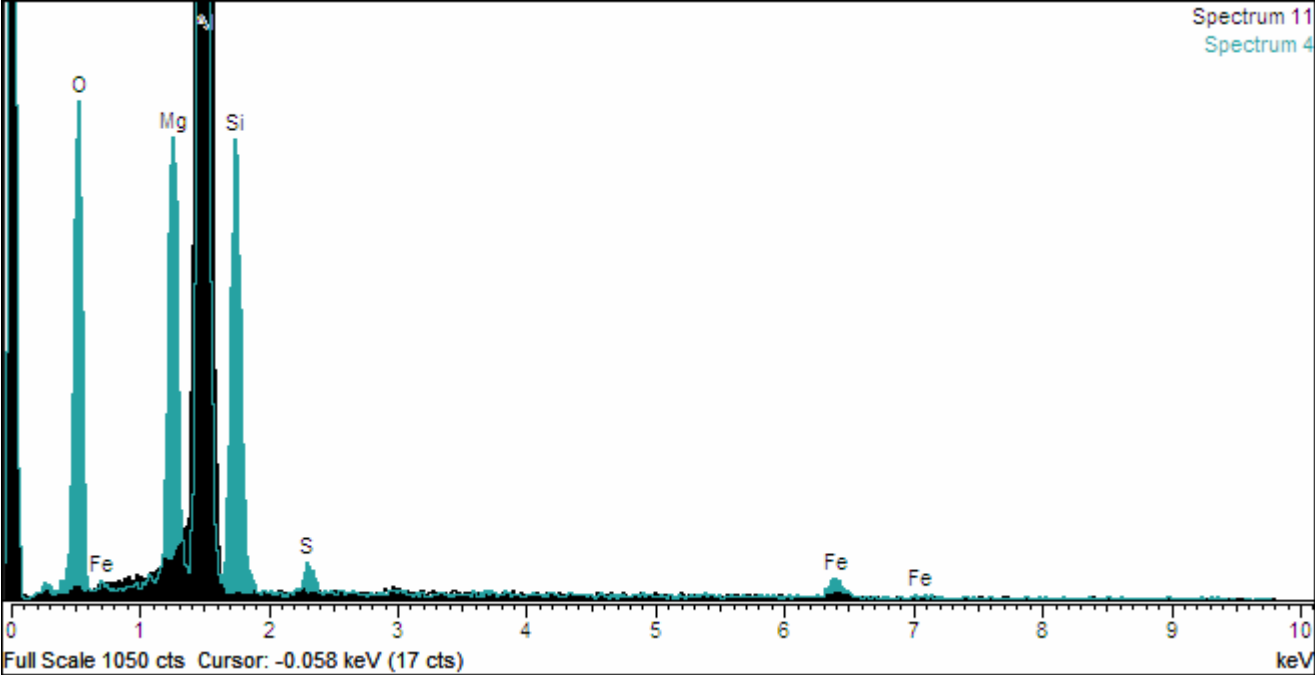
Stardust foil C2029W,1

X-ray maps

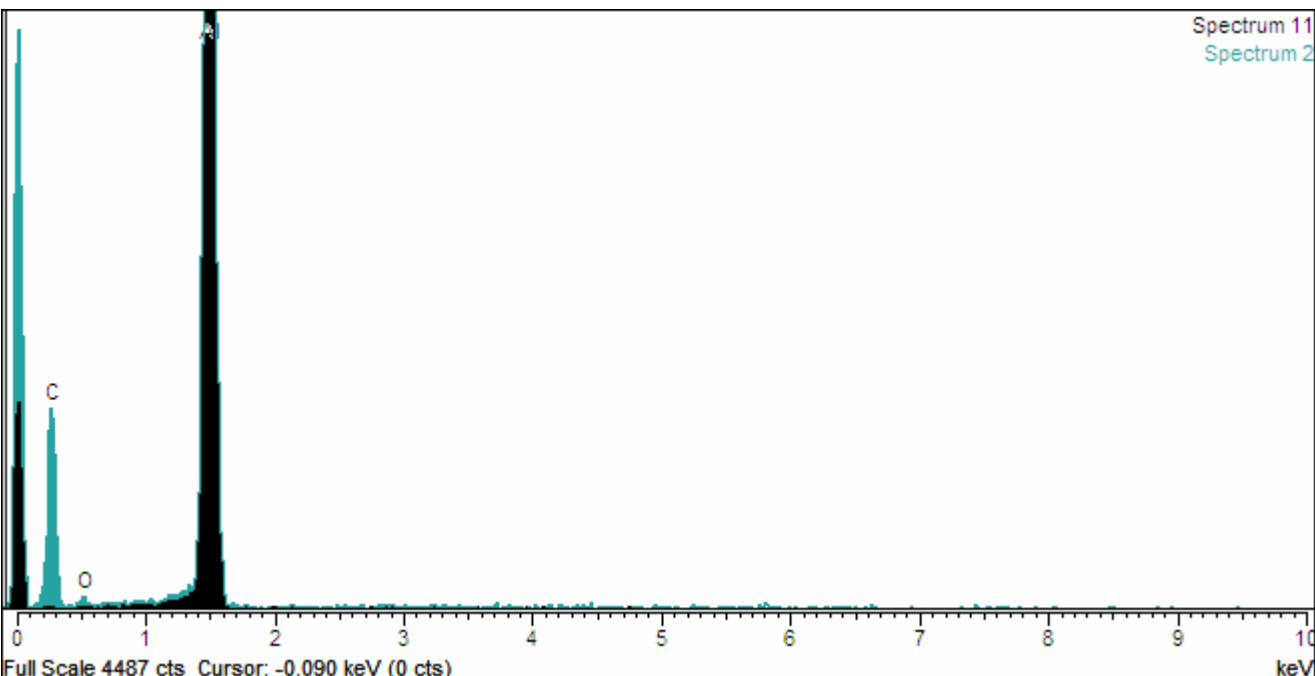


Stardust foil C2029W,1

Mg-rich
silicate
dominates



Carbon rich
residue or
contaminant?



BEI grey

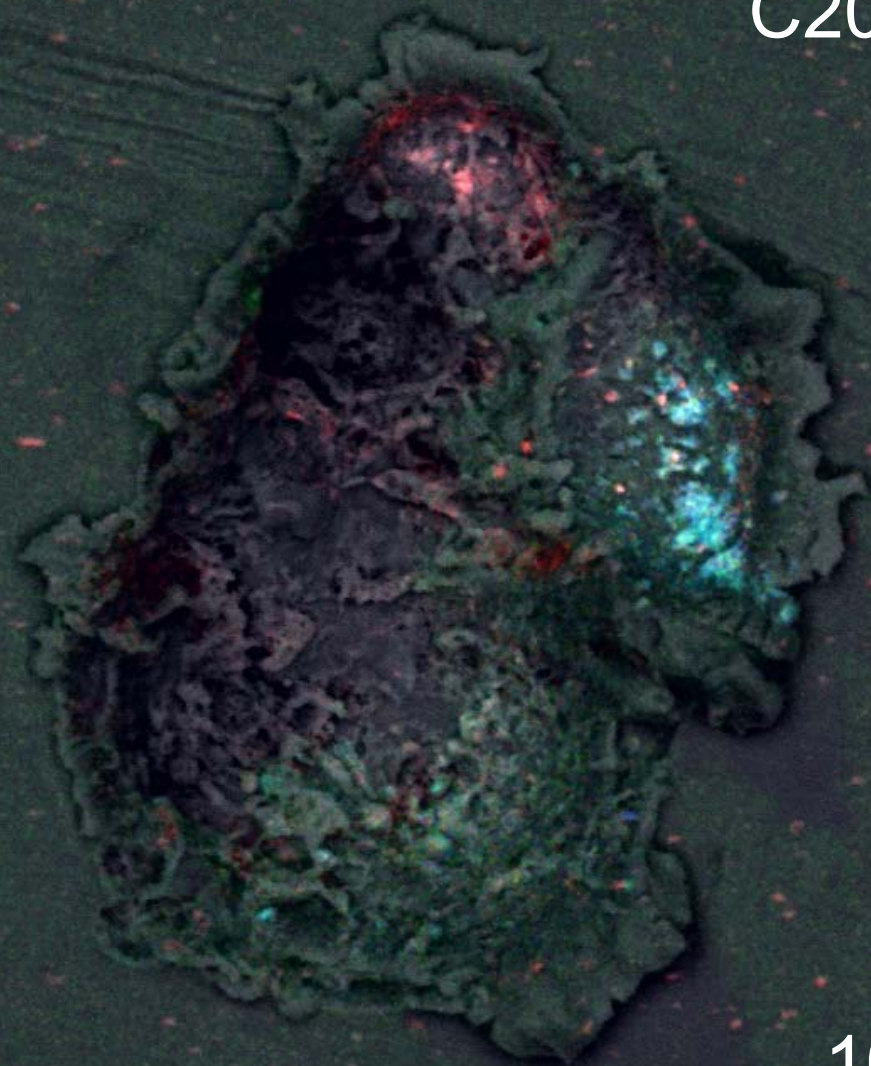
Mg green

Si blue

Ca yellow

Fe red

C2029W, 1



100 μm

100 μm

BEI grey

Mg blue

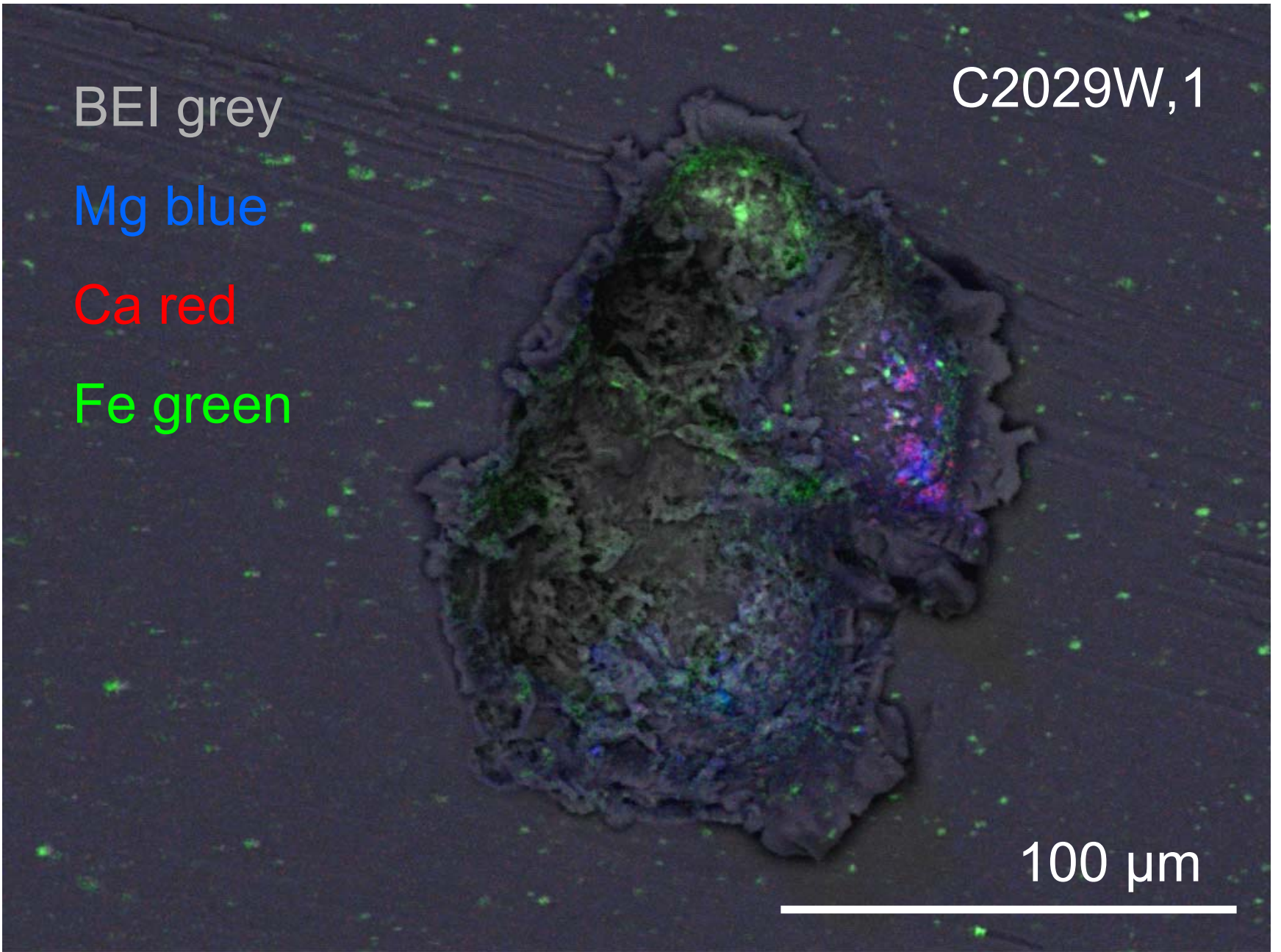
Ca red

Fe green

C2029W, 1

100 μm

100 μm



Ca-bearing silicates ?pyroxenesak060523f phase 2 Ca-rich silicate

EDS analyses, normalised, crater floor

Element	Weight%	Weight% sigma	Atomic%	Compound%	Formula	Number of ions
Na	0.9	0.3	0.8	1.1	Na ₂ O	0.3
Mg	19.2	0.4	16.5	31.8	MgO	6.6
Si	24.7	0.4	18.5	52.9	SiO ₂	7.4
S	0.9	0.1	0.6	2.2	SO ₃	0.2
Ca	3.6	0.2	1.9	5.0	CaO	0.7
Cr	0.7	0.2	0.3	1.1	Cr ₂ O ₃	0.1
Fe	4.5	0.4	1.7	5.8	FeO	0.7
O	45.5	0.5	59.7		for O= 24	

ak060519c site BEI sp 7 Ca-rich silicate

Element	Weight%	Weight% sigma	Atomic%	Compound%	Formula	Number of ions
Mg	20.6	0.5	17.7	34.1	MgO	7.1
Si	24.2	0.4	18.0	51.8	SiO ₂	7.3
S	0.9	0.2	0.6	2.2	SO ₃	0.2
Ca	3.9	0.2	2.0	5.5	CaO	0.8
Fe	4.0	0.4	1.5	5.1	FeO	0.6
O	45.5	0.6	59.4		for O= 24	

Mg silicates ?pyroxene

EDS analyses, normalised, crater floor

C2029W,1

ak060519c site BEI2 sp5 Mg silicate

Element	Weight%	Weight% sigma	Atomic%	Compound%	Formula	Number of ions
Na	1.5	0.9	1.3	2.0	Na2O	0.5
Mg	23.9	1.2	20.6	39.6	MgO	8.4
Si	18.9	1.0	14.1	40.5	SiO2	5.7
S	3.5	0.5	2.3	8.8	SO3	0.9
Fe	7.2	1.3	2.7	9.3	FeO	1.1
O	45.1	1.5	59.0		for O=24	24.0

ak060519c site BEI2 sp4 Mg silicate

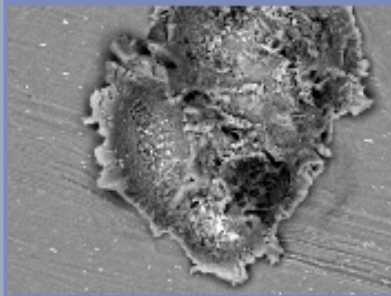
Element	Weight%	Weight% sigma	Atomic%	Compound%	Formula	Number of ions
Mg	25.0	0.4	21.0	41.4	MgO	8.5
Si	23.7	0.4	17.3	50.7	SiO2	7.0
S	1.5	0.2	1.0	3.7	SO3	0.4
Fe	3.3	0.3	1.2	4.2	FeO	0.5
O	46.6	0.5	59.6		for O=24	24.0

ak060524a site2 sp 4 Mg silicate

Element	Weight%	Weight% sigma	Atomic%	Compound%	Formula	Number of ions
Mg	25.8	1.3	21.7	42.8	MgO	8.8
Si	23.4	1.2	17.1	50.1	SiO2	6.9
S	1.2	0.5	0.8	3.0	SO3	0.3
Fe	3.3	1.7	1.2	4.2	FeO	0.5
O	46.3	1.6	59.3		for O=24	24.0

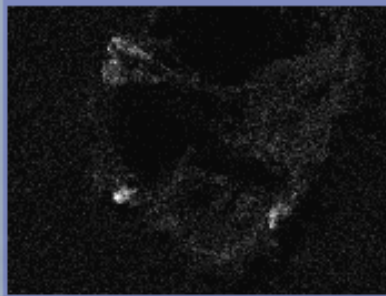
C2029W, 1

Electron Image 1



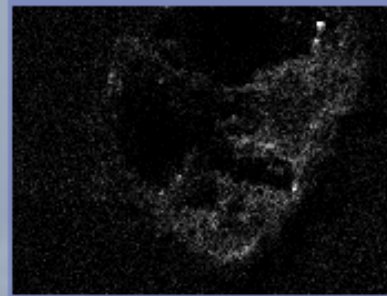
80µm

C Ka1_2



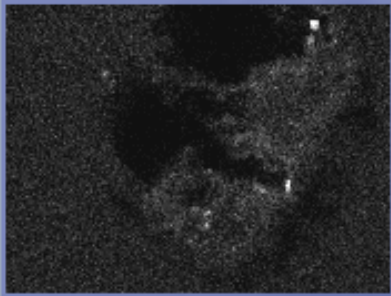
80µm

O Ka1



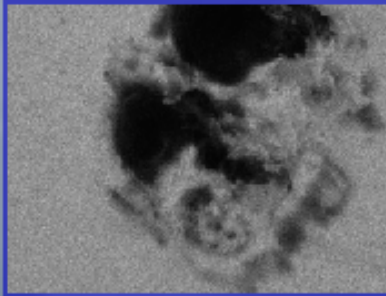
80µm

Mg Ka1_2



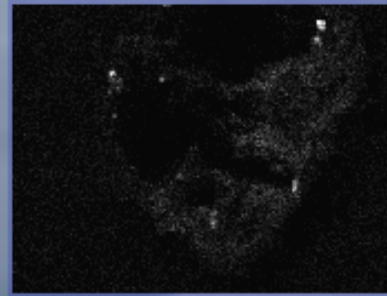
80µm

Al Ka1



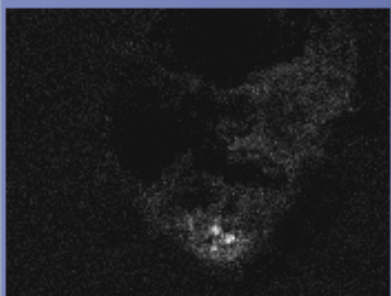
80µm

Si Ka1



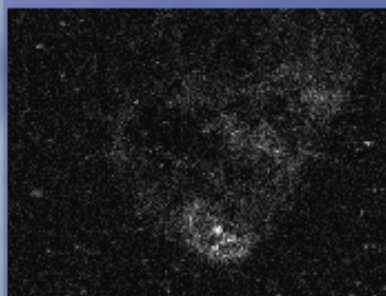
80µm

S Ka1



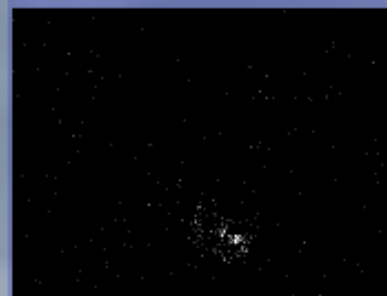
80µm

Fe Ka1



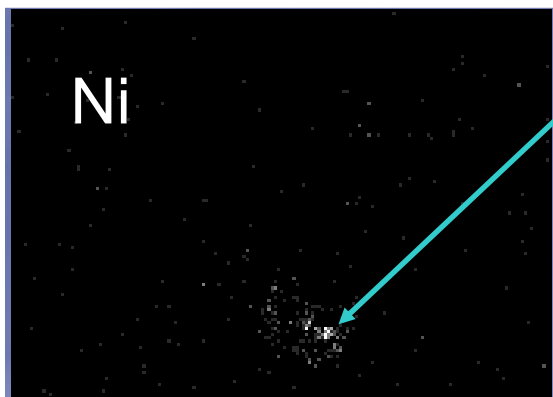
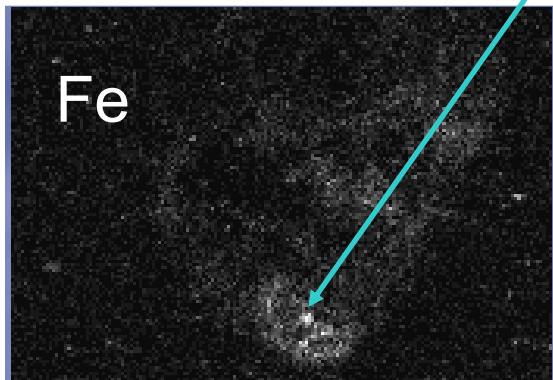
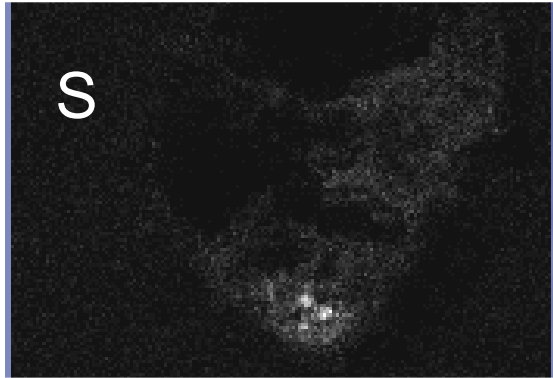
80µm

Ni Ka1

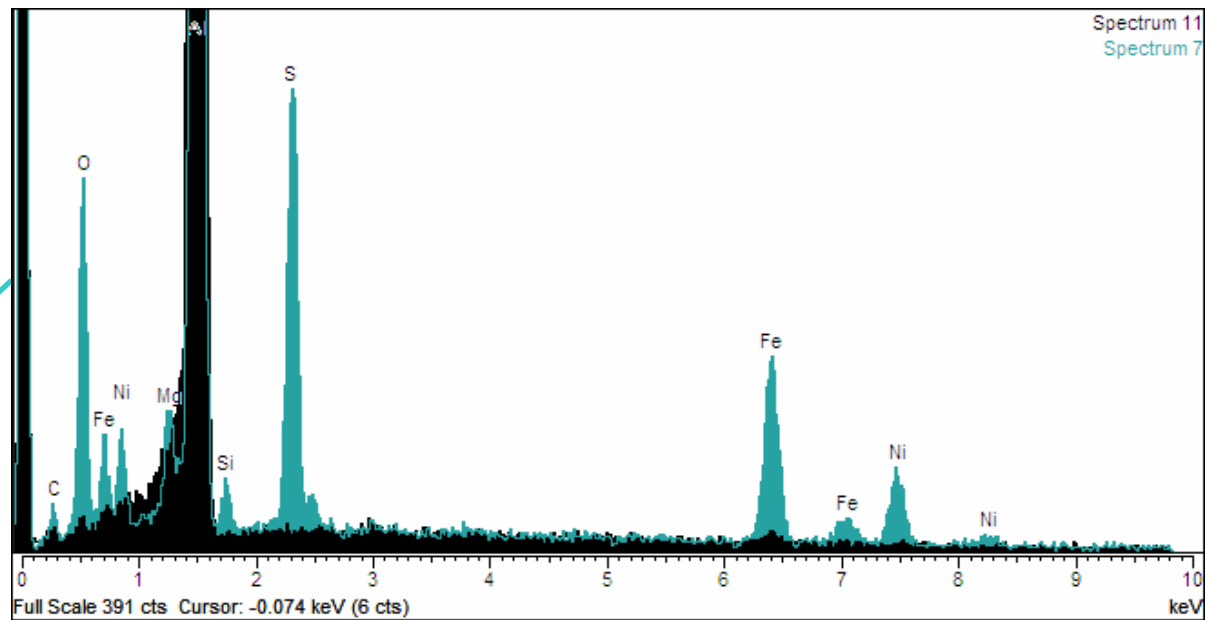
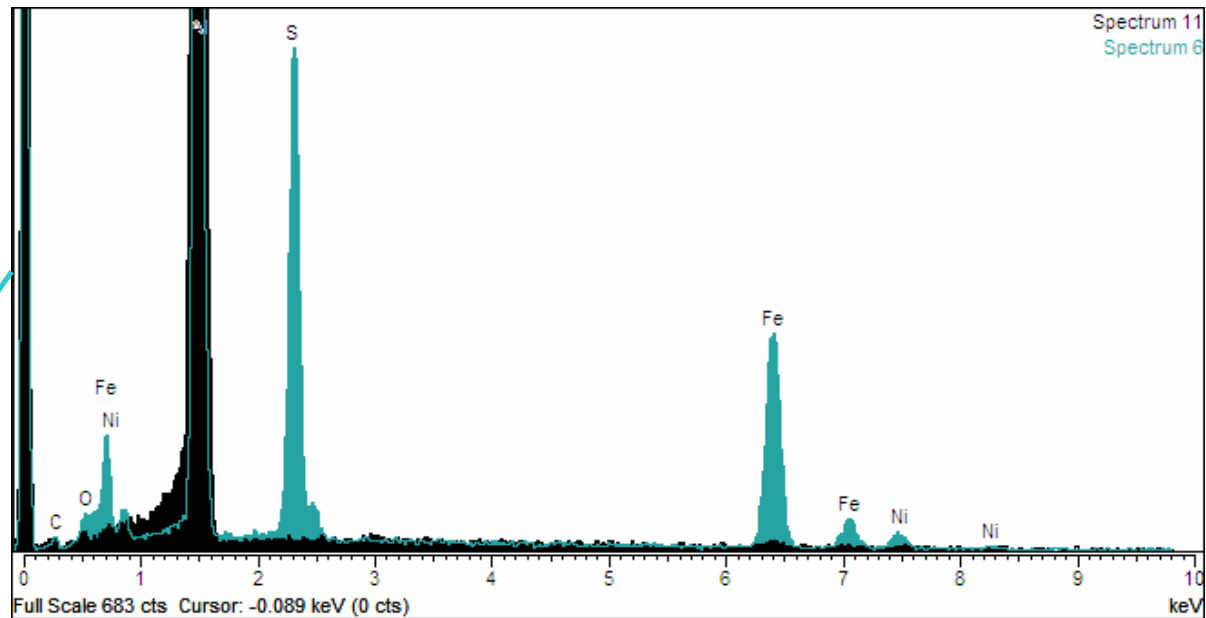


80µm

Stardust foil C2029W, 1



80 μm



Stardust foil C2029W, 1

low Ni
sulfide

high Ni
sulfide

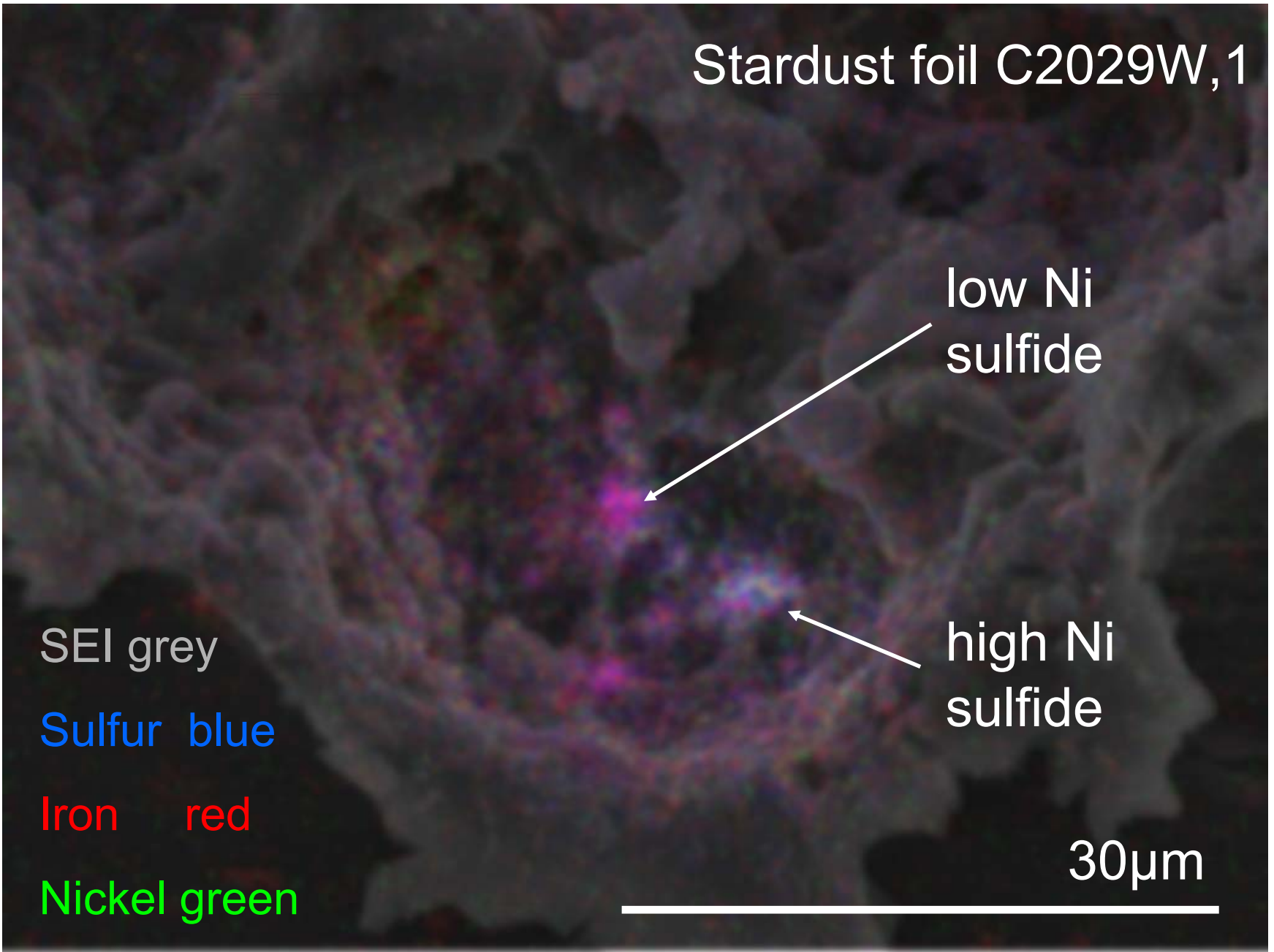
SEI grey

Sulfur blue

Iron red

Nickel green

30μm



Stardust foil C2029W,1

Sulfides

EDS analyses, normalised, crater floor

ak060524a site4 sp 1 sulfide

Element	Weight%	Weight% sigma	Atomic%
S	34.8	0.3	48.3
Fe	58.9	0.4	46.9
Ni	6.3	0.3	4.8
Totals	100		

ak060524a site4 sp 2 sulfide

Element	Weight%	Weight% sigma	Atomic%
S	31.7	0.4	45.2
Fe	38.5	0.5	31.5
Ni	29.8	0.5	23.2
Totals	100		