Stardust foil C2086N,1

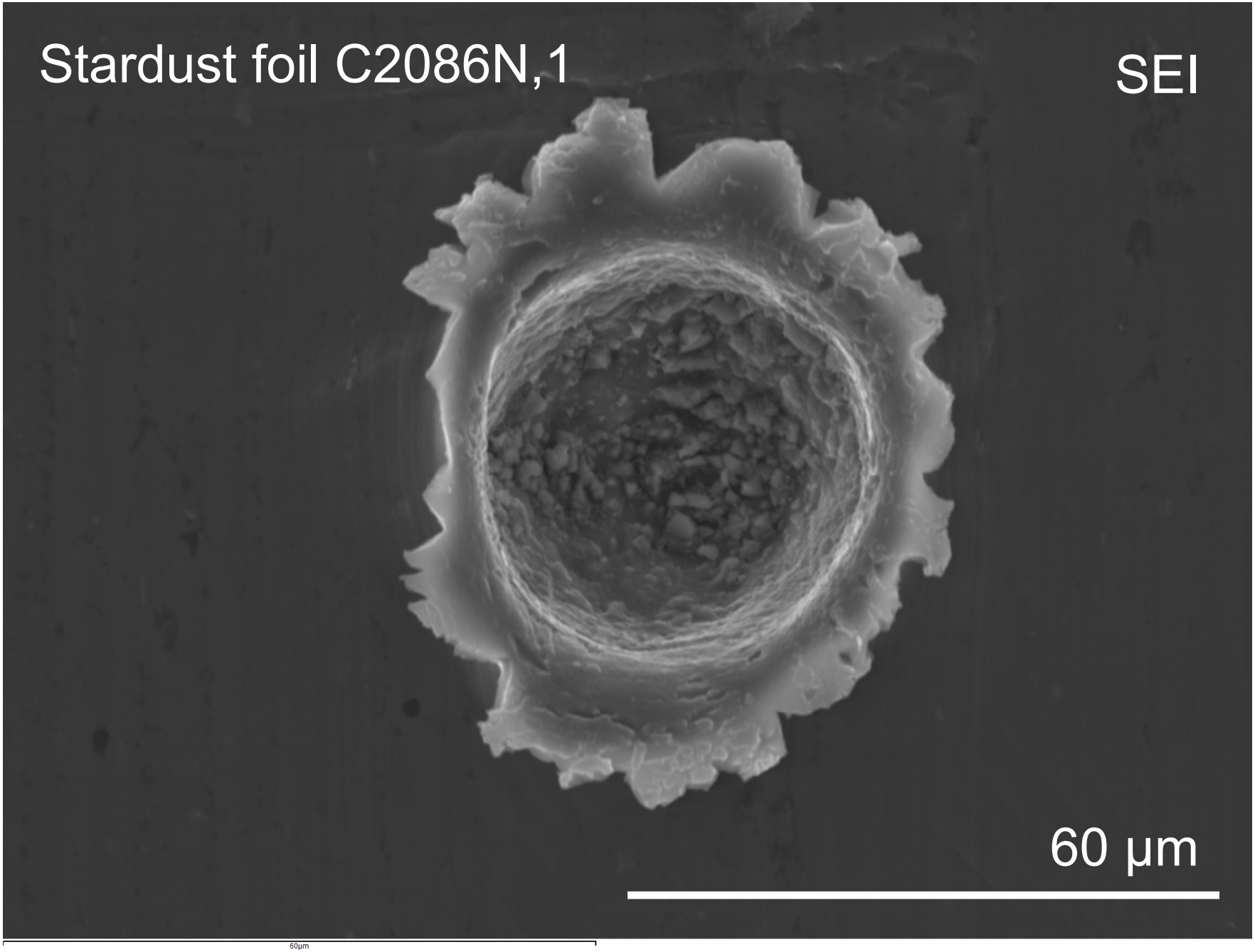
Electron imagery

Stereometric reconstruction

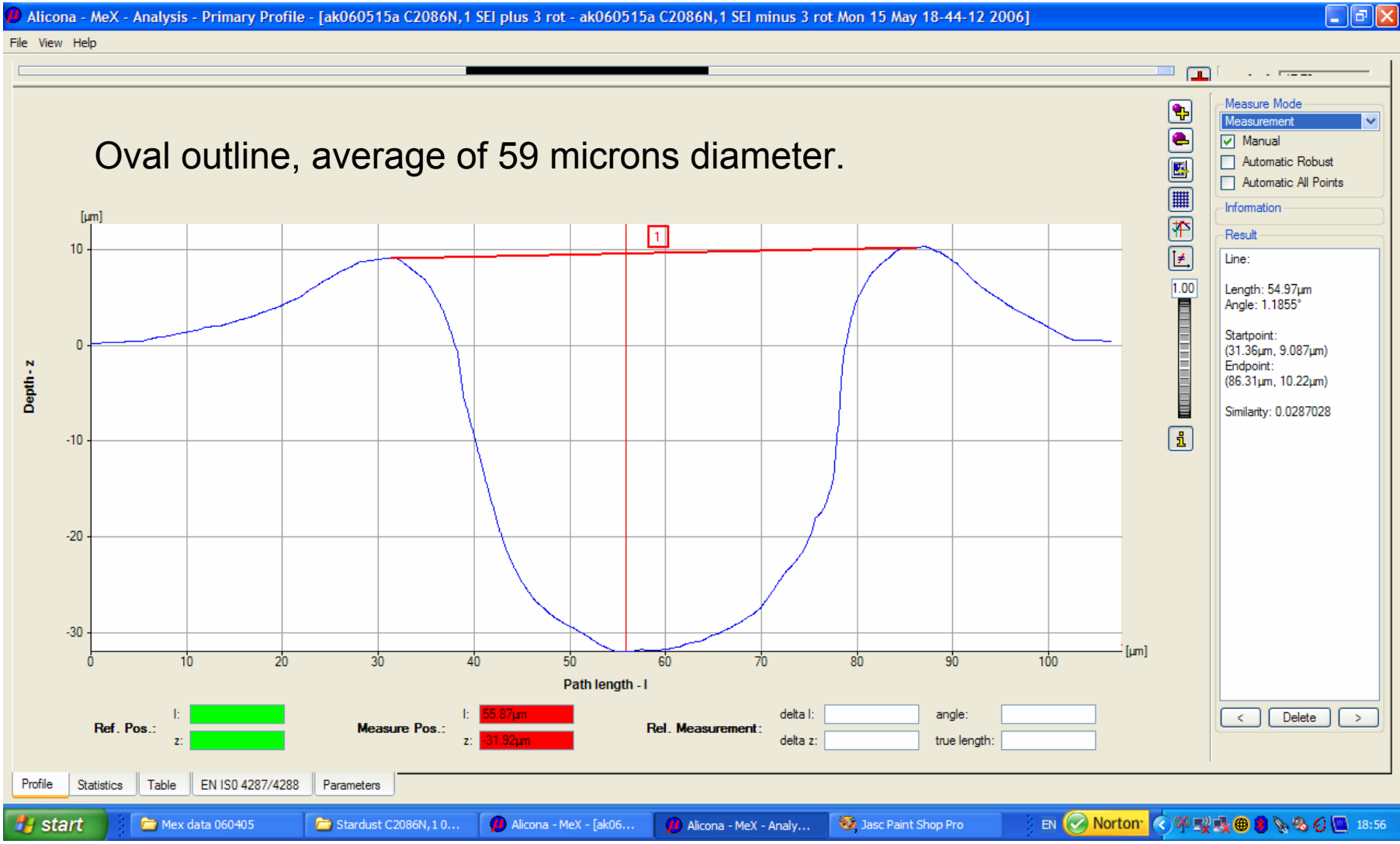
X-ray maps

Quantitative Energy Dispersive X-ray analyses

Anton Kearsley, NHM May 2006


Stardust foil C2086N,1
SEI
60 µm
60µm

Stardust foil C2086N,1



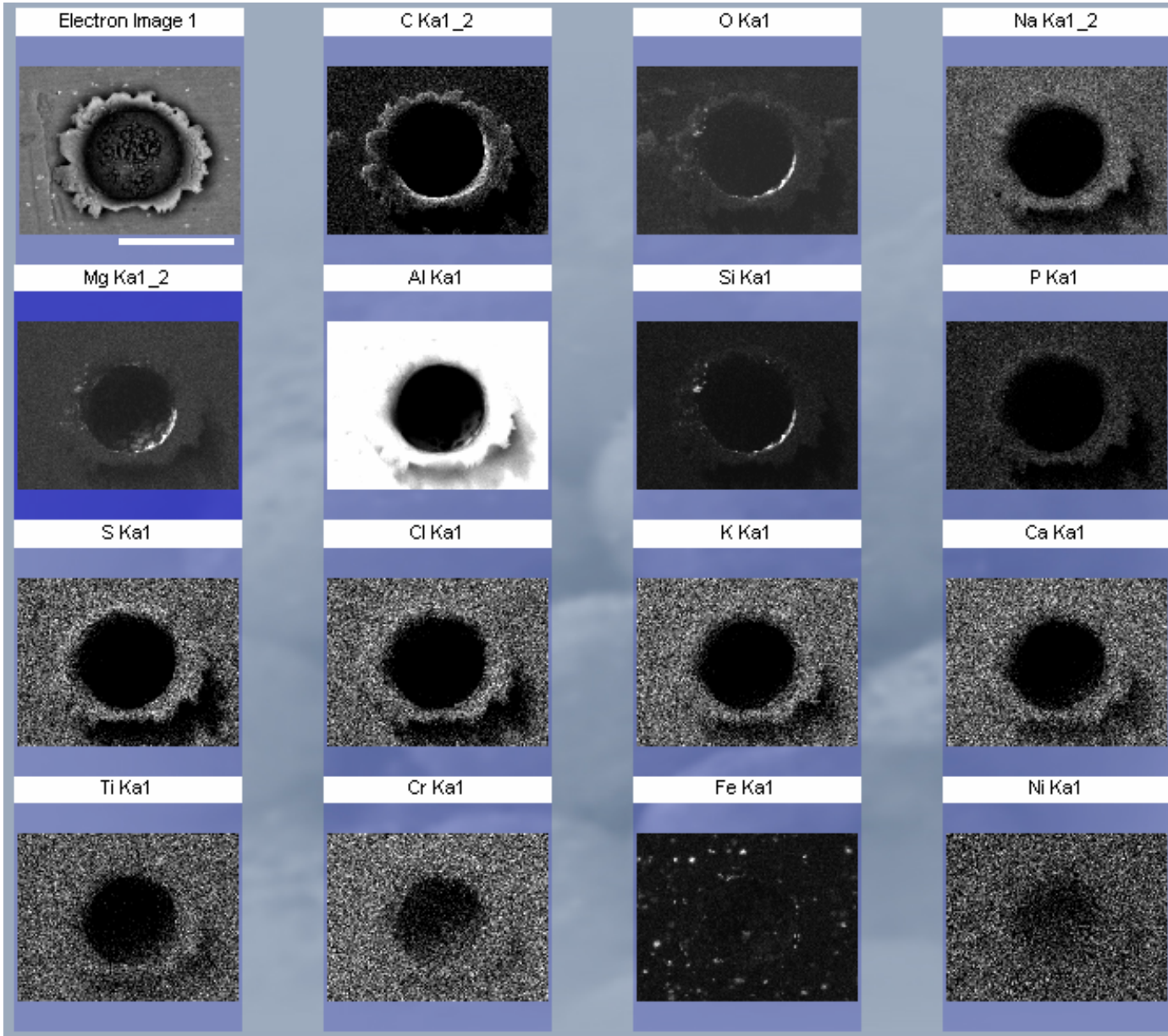
Stardust foil C2086N,1

X-ray maps with beam-normal incidence.

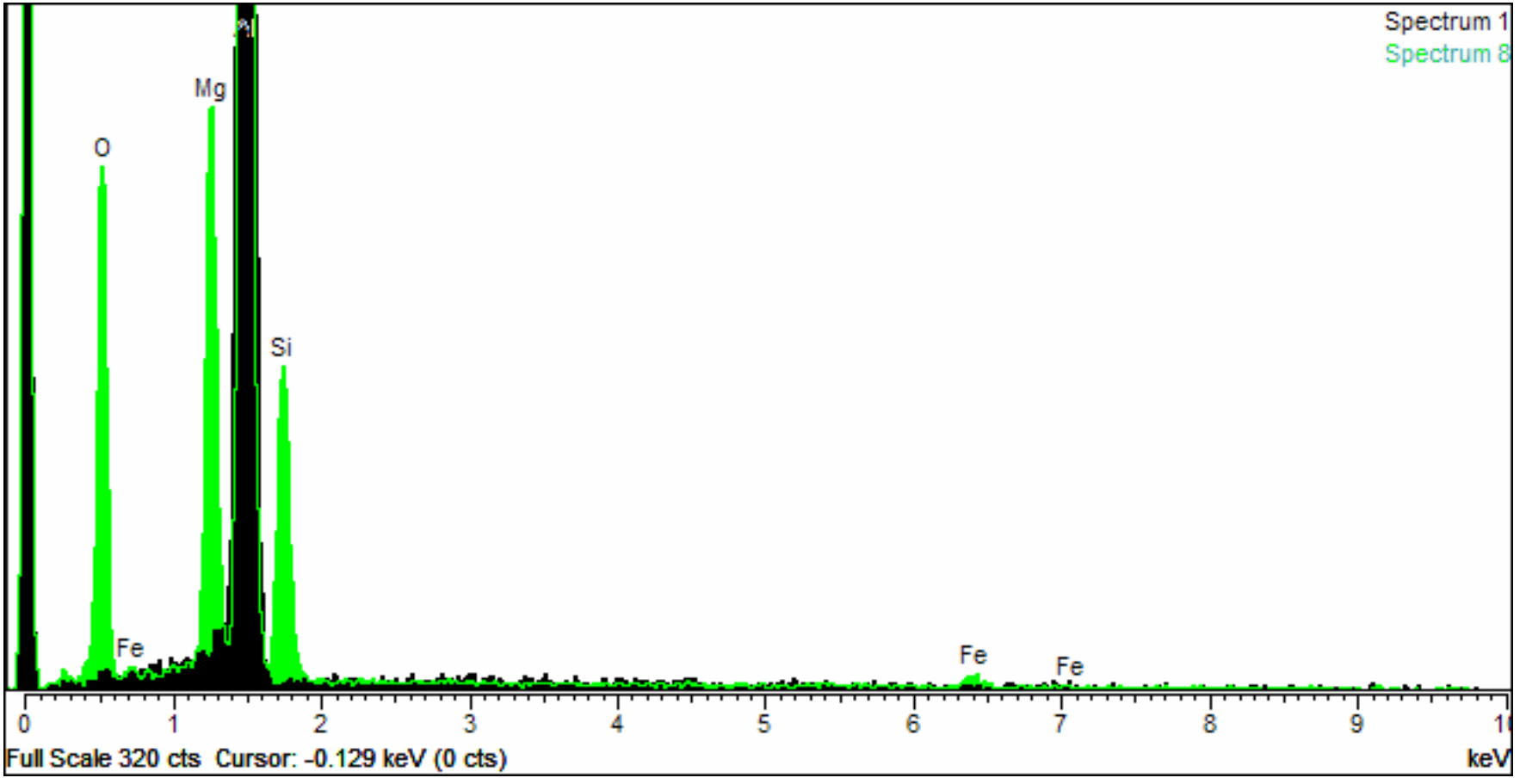
Residue can be located at the crater rim, but not on the walls or floor

60 μm

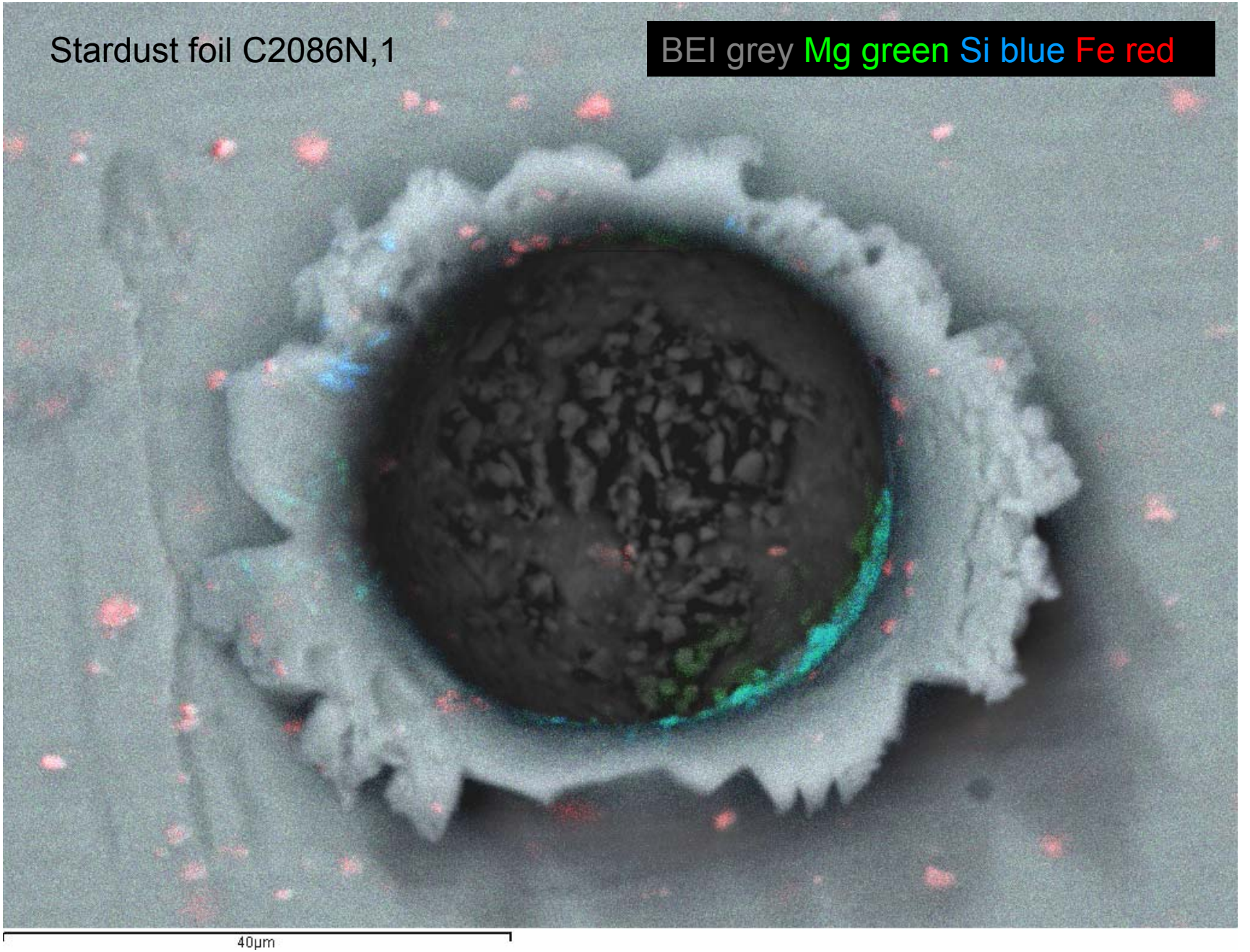
scalebar

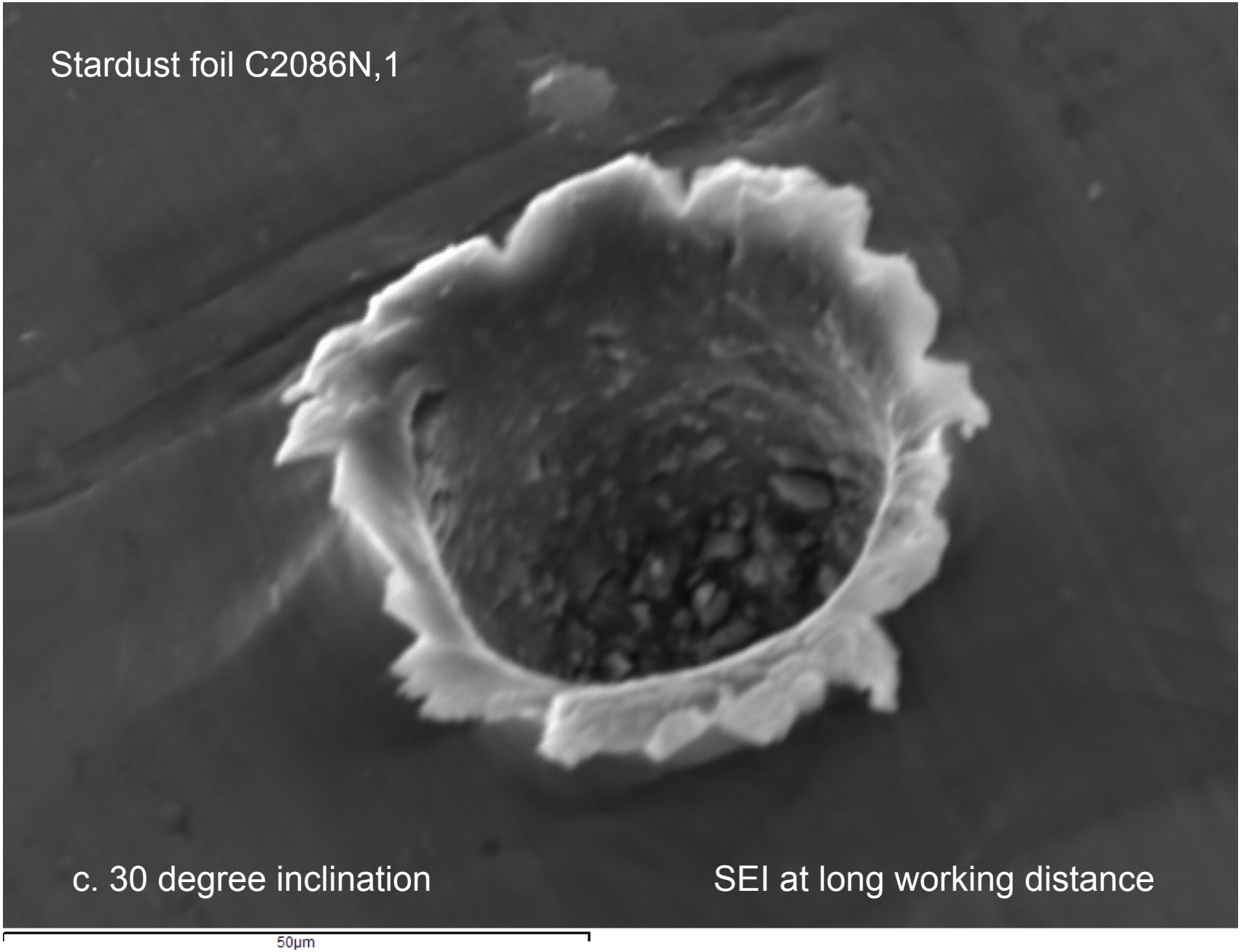


Stardust foil C2086N,1

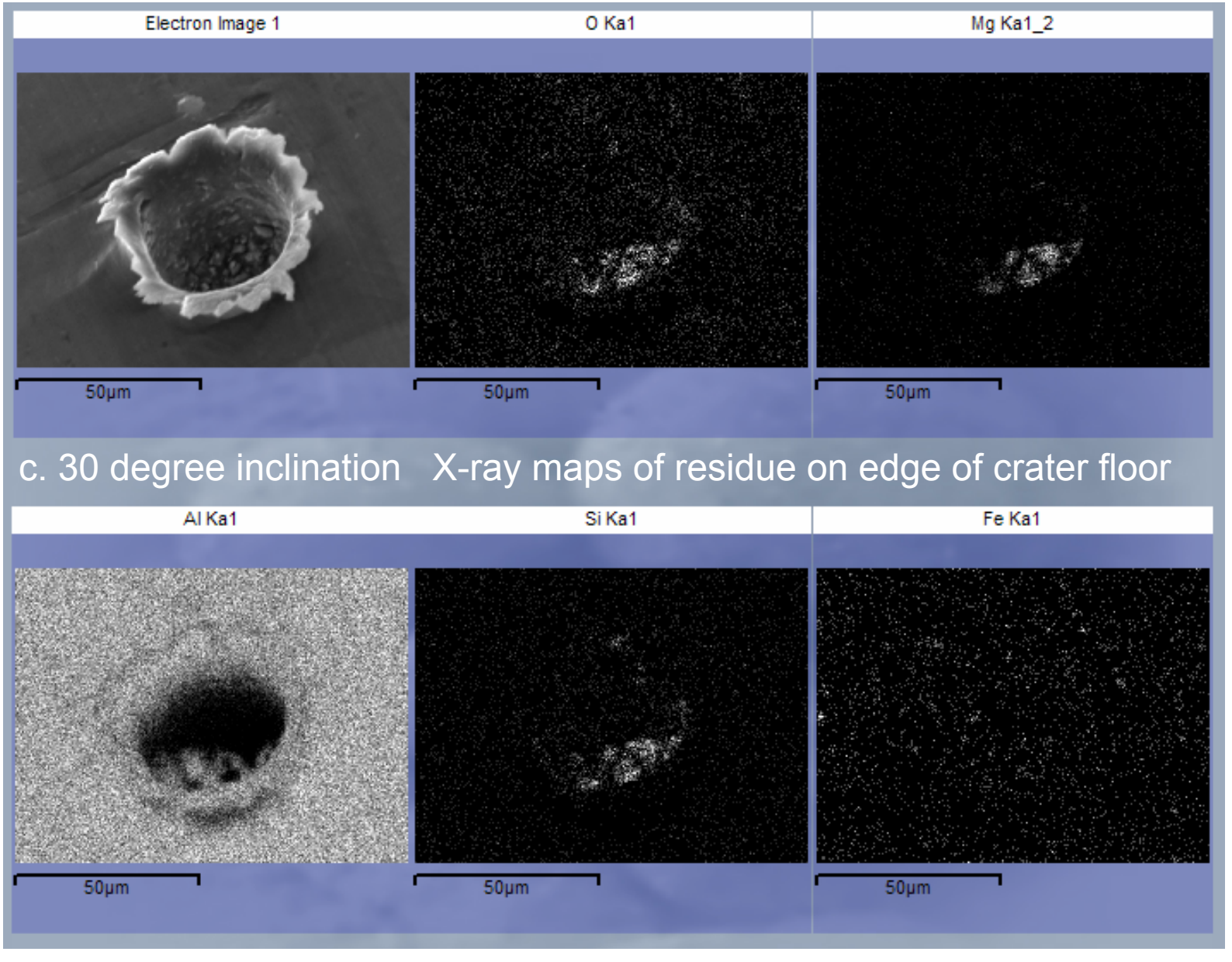


Typical EDS X-ray spectrum of residue on crater lip (green) superimposed on spectrum of nearby aluminium alloy surface. Mg-rich olivine.


Stardust foil C2086N,1
BEI grey Mg green Si blue Fe red
40µm

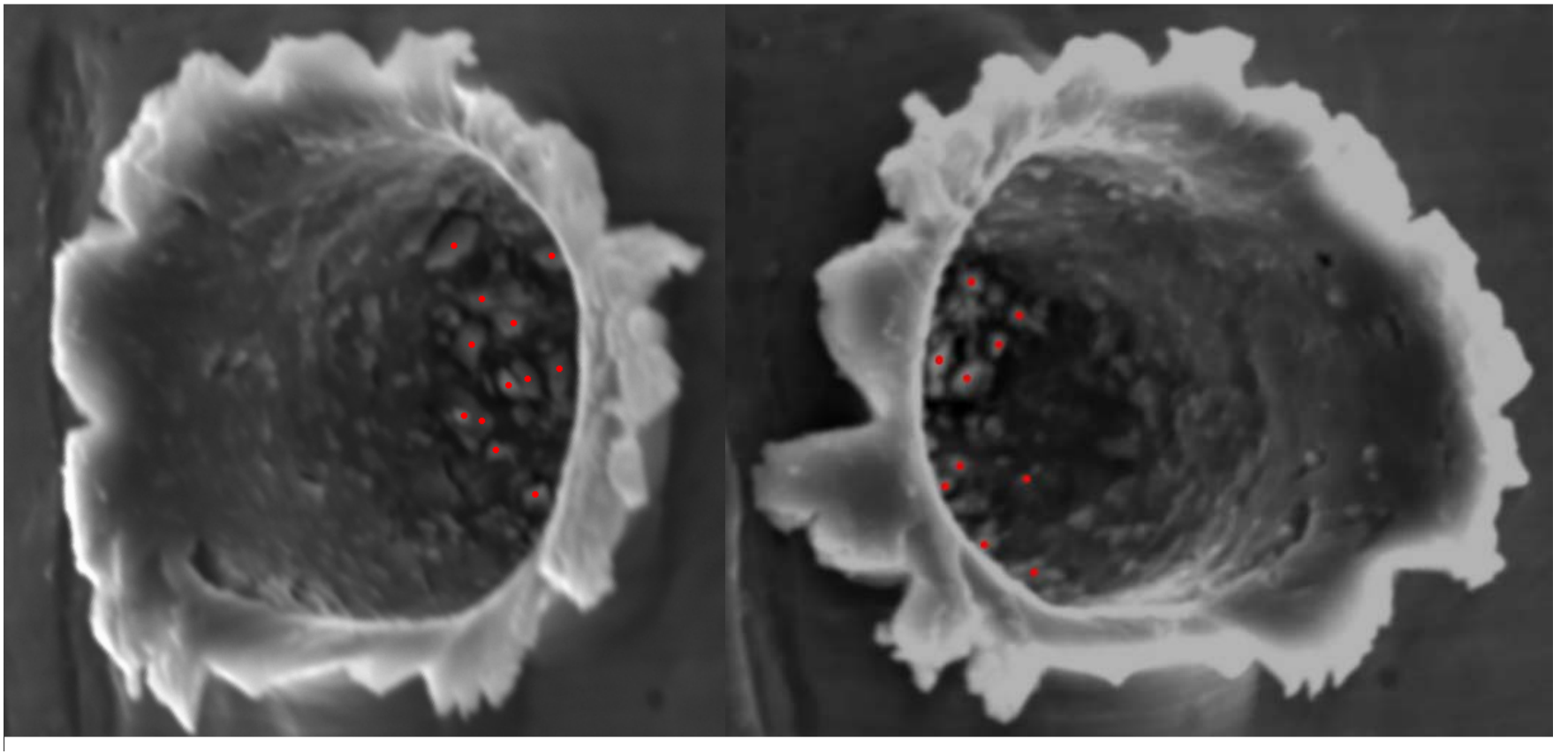

Stardust foil C2086N,1
c. 30 degree inclination
SEI at long working distance
50µm

Stardust foil C2086N,1



c. 30 degree inclination X-ray maps of residue on edge of crater floor

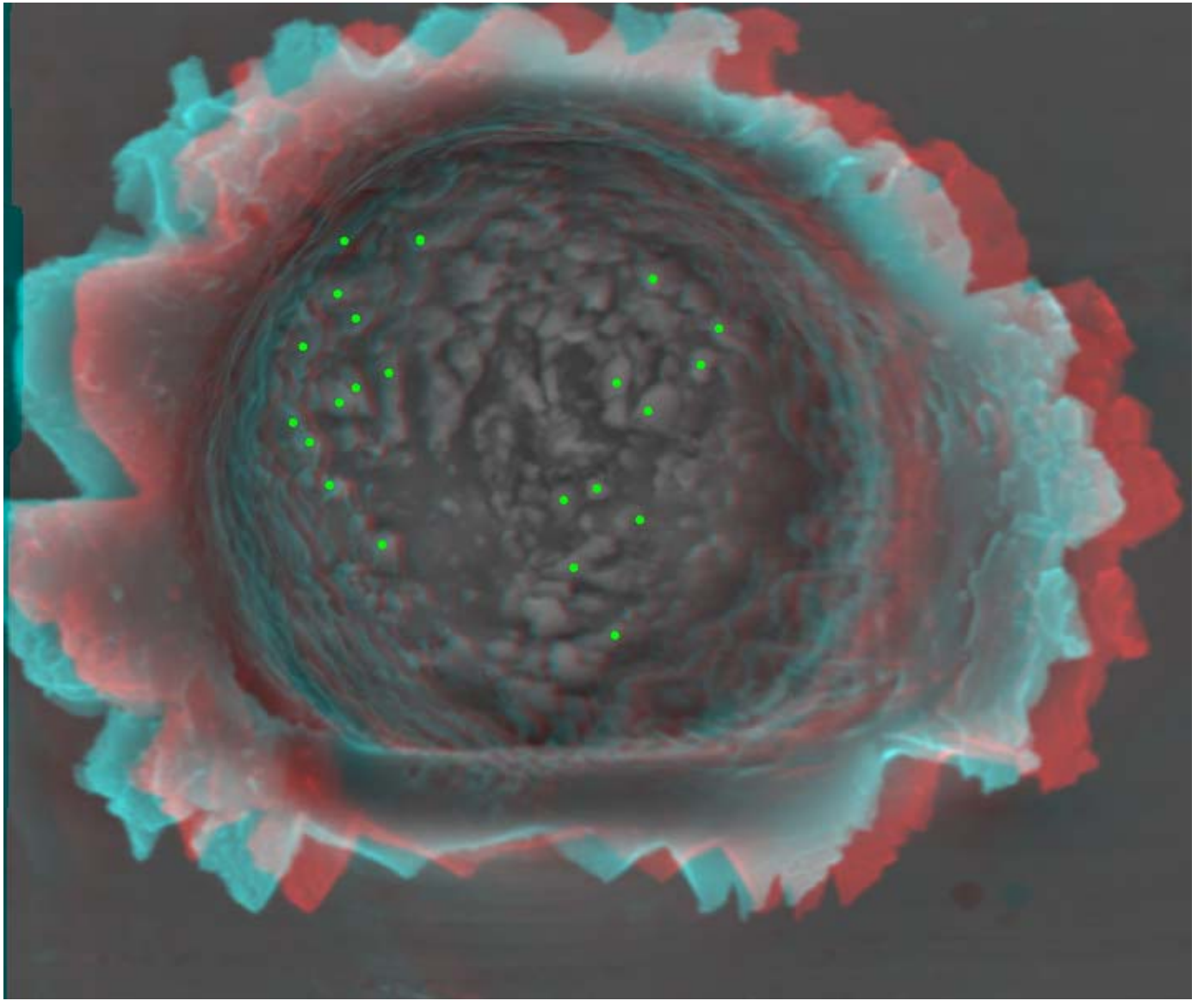
Stardust foil C2086N,1



Red points all yielded indistinguishable analyses of high-Mg olivine, with good stoichiometry and Fo:Fa c. 97:3%.

Stardust foil C2086N,1 stereo anaglyph

Locations of olivine analyses shown as green dots



Sample: C2086N,1

Processing option : Oxygen by stoichiometry (Normalised)

All results in atomic%

	Mg	Si	Fe	O	Fo%
Spectrum 1	27.9	14.3	0.7	57.1	97.6
Spectrum 2	28.1	14.2	0.6	57.1	97.8
Spectrum 3	27.7	14.3	0.9	57.1	96.9
Spectrum 4	28.1	14.1	0.7	57.1	97.5
Spectrum 5	27.6	14.3	0.9	57.2	96.8
Spectrum 6	27.8	14.3	0.7	57.2	97.6
Spectrum 7	27.9	14.4	0.6	57.2	98.0
Spectrum 8	28.0	14.2	0.7	57.1	97.5
Spectrum 9	28.4	13.8	0.9	56.9	97.0
Spectrum 10	28.5	13.7	0.9	56.9	96.8
Spectrum 11	27.9	14.3	0.7	57.1	97.5
Spectrum 12	30.9	12.8	0.0	56.4	100.0
Spectrum 13	28.4	13.9	0.8	56.9	97.2
Average	28.2	14.0	0.7	57.0	97.5
Std Deviation	0.8	0.4	0.2	0.2	0.8

Stardust foil C2086N,1

A bowl-shaped crater of 59 microns top-lip average diameter, similar depth to lab. impacts of olivine grains under the same velocity conditions.

Impact by a single dense grain of one mineral species?

Density-scaled crater diameter calibration suggests: particle diameter c. 11 μm, and mass c. 2 ng.

There is abundant residue on crater walls and floor

All analyses of residue by EDS are very similar, showing olivine with good stoichiometry of c. 97 Fo %.