EDXRF User Training

6. Spectral Mapping and Line-Scan
Mapping Setup Window

**Matrix**: # of points collected in X and Y

**Dwell**: time per individual point (msec)

**EDS Mode**: Clock vs. Live time

**Data Type**: ROI (gross), Net (subtraction & deconvolution), Wt%

**Spectrum Map**: Stores data at each point

**Map KV Limit**: # of channels stored
Mapping – Relative X/Y Matrices

- 32 × 25
- 64 × 50
- 128 × 100
- 256 × 200

- 2kB
- 5kB
- 14kB
- 52kB

Video image
Mapping – Step Size vs. Beam Diameter

- Step size
- Beam diameter $\phi$

- 2.0 “beam-$\phi$”/step
- 0.5 step/ “beam-$\phi$”
- 1.0 “beam-$\phi$”/step
- 1.0 step/ “beam-$\phi$”
- 0.5 “beam-$\phi$”/step
- 2.0 steps/ “beam-$\phi$”
Mapping – Step Size vs. Beam Diameter

- 2.0
- (0.5)
- 32 ´ 25
- 64 ´ 50
- 128 ´ 100
- 256 ´ 200

f=300µm

- 1.0
- (1.0)

- 0.5
- (2.0)

- 0.25
- (4.0)
Mapping – Step Size vs. Beam Diameter

2.0

(0.5)

32 \times 25

1.0

(1.0)

64 \times 50

f=300\mu m

0.5

(2.0)

128 \times 100

0.25

(4.0)

256 \times 200
Mapping - Dwell Time

- 100ms
- 500ms
- 1000ms
Quality of Saved Video Images

“Small”

“Large”

“n – pixels”

“4n – pixels”
Mapping Example – PCB Board 512x400

85.5´66.7mm  512´400 pixels
Mapping Example – Total Counts Image

85.5 mm × 66.7 mm
512 pixels × 400 pixels
Spectral Mapping: Data Mining

- In-depth knowledge of sample is not required at time of mapping → *ELEMENTS CAN BE RE-BUILT WITH SPD*

- Sample available for a short time only

- Spectral Data Mining: *Point by point*
  *Summation of region or total map*
  *Display of Linear Distributions*

- Return to Sample from Map for improved statistical significance

- Spectrum Background subtraction
Spectral Mapping: Data Mining

Point extraction – immediate display of spectra at any point in the map, just by clicking
Spectral Mapping: Data Mining

You can also draw a matrix (box) around any area in the map, the points will be automatically summed together and the resultant spectrum displayed. This is useful for verifying artifact/real elemental peaks in maps.
Spectral Mapping: Data Mining

Line-Scan extraction – immediate display of line profile, simply by drawing a line
Spectral Mapping: Total Map Spectrum

Definition: All map spectra added together

A Total Area Spectrum is automatically saved with each map. User can go back to identify major/minor concentrations of elements, and re-built those maps.

Total Sandstone Map Spectrum 09:58:48 29-Jul-98 kV:20 uAmp:1000

Fsc: 67445  Cps: 0  LSec: 6465  Prst: 200L  Rev: 0.33  Cnt: 800  A: 00X1000.
Spectral Mapping: Total Map Spectrum

Overlay: Na, Si, Ca

Na - Green
Si - Blue
Ca - Red
K - Cyan

Overlay: Na, Si, Ca, K

Potassium Map
Spectral Mapping: Max Channel Spectrum

• Goes through the entire SPD, and isolates on the highest intensity at any given point & channel

MaxChannel (red) clearly shows some hotspots of Si, S, and K, which are not so visible in the Total Area Spectrum. Again, this can assist in finding which elemental maps to re-build.
Line-Scan Package