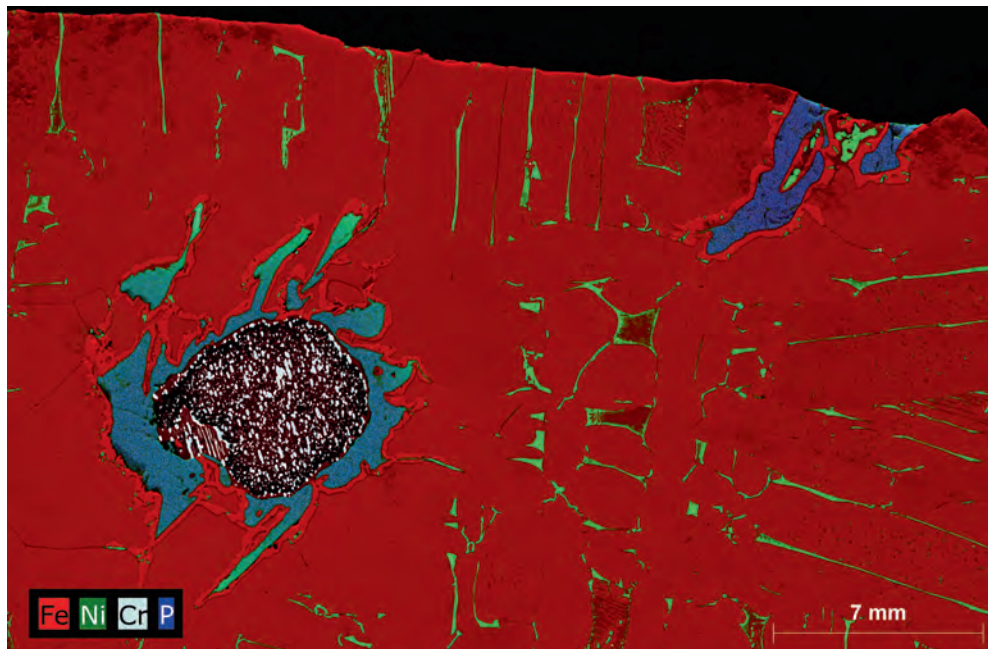**MICRO-XRF**

Ultra Large Maps

Advanced Features for
M4 TORNADO and M6 JETSTREAM

Innovation with Integrity

ESPRIT 1.6 - A Tool for Ultra Large Maps

With the ESPRIT 1.6 software version for Bruker's Micro-XRF spectrometers M4 TORNADO and M6 JETSTREAM large elemental distribution maps with more than 40 megapixels can be created. This allows to combine the high spatial resolution of the instruments with their large scanning areas and extends the scope of applications to higher resolution analyses or larger sample systems.

ESPRIT 1.6 Key Benefits

- Acquisition of large maps up to 9000 x 7000 pixel
- Easy sample handling and image focusing
- Complete or piecemeal (offline) post-processing
- Extensive control of layer and bulk quantification

With ESPRIT 1.6, the M4 TORNADO family instruments are able to acquire maps of the whole stage area of 190 x 160 mm² at pixel sizes of 25 µm. With the M6 JETSTREAM, large maps of 800 x 600 mm² at 100 µm pixel size can be acquired.

The ESPRIT 1.6 software version also includes useful workflow enhancements for sample handling, sample positioning and navigation, image focusing and mosaic image creation.

The stage can now be centered in both vector and z-focus mode. When creating a mosaic image, the stage can be driven to several positions one after another to set different mosaic boundaries. The software remembers the previously set boundary and shows the current stage position.

ESPRIT 1.6 allows the streaming of the map data directly to the hard drive. This means that the software's maximum map size no longer depends on architecture or installed RAM and permits the acquisition of ultra large maps of over 40 megapixels. The maximum attainable map size can be achieved if one detector is selected, and the map is recorded as a one-cycle data set. To speed up data postprocessing it is recommended to use a solid-state hard drive for the (offline) processing PC.

With such large maps the ability to cut out smaller map sections for piecemeal analysis is crucial. ESPRIT 1.6 can export all the selected areas/objects in one key stroke improving the usability and the handling of large maps immensely.

Creation of large element maps

Bat fossil with skeleton details
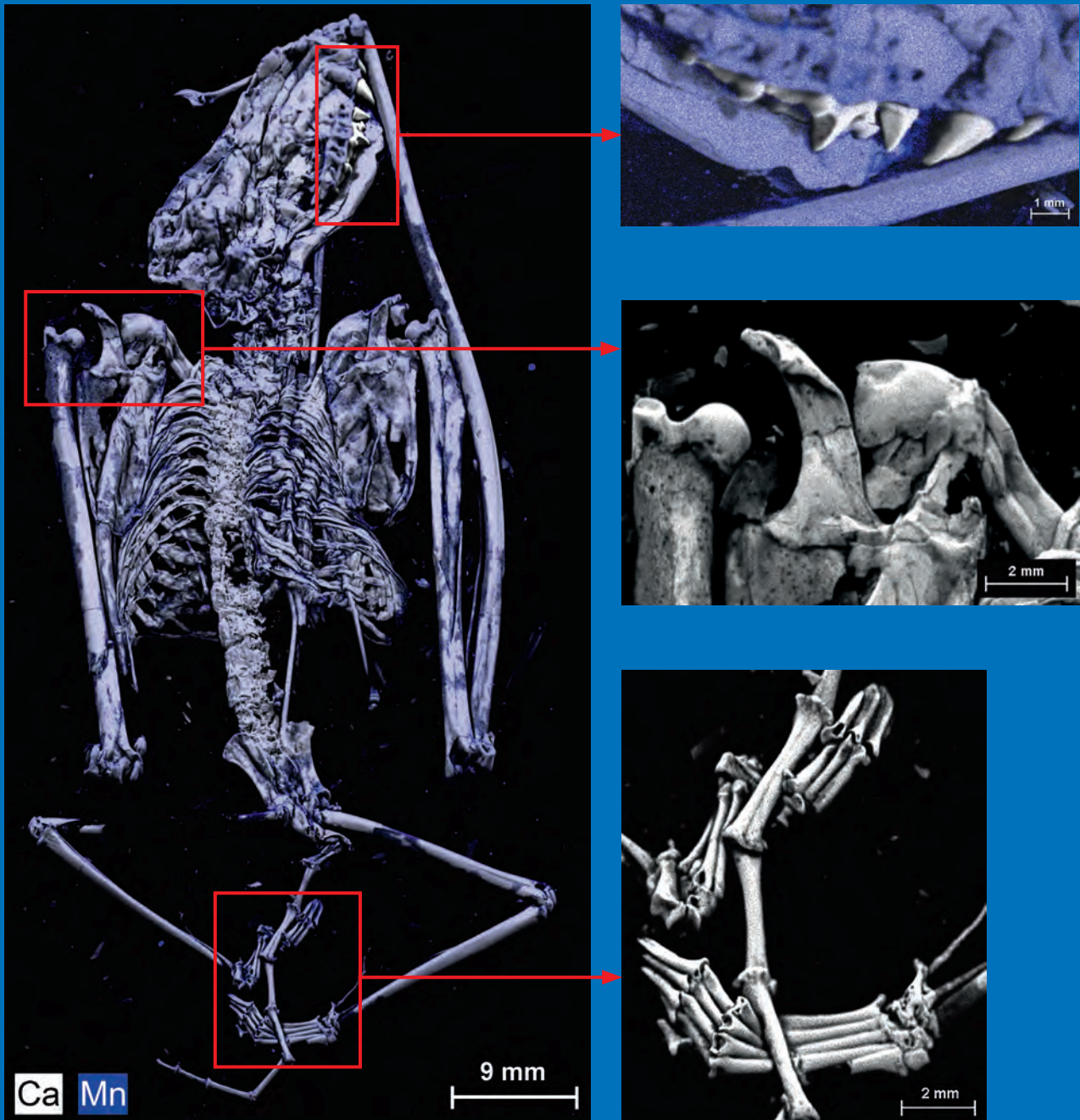
Element distribution map of a 47-million-year-old bat fossil from the collection of the Senckenberg Museum, Frankfurt/M., Germany. The bat fossil was scanned with the M4 TORNADO, map size was 43 mm x 82 mm with a pixel size of 25 μm (1700 x 3300 pixel). The element distributions for Ca (white) and Mn (blue) are shown. Both elements are present in the bones but only Ca is abundant in the teeth. The detail images show the high data quality displaying the bat's jawbone, the shoulder and the feet with part of the tail.

Large maps of 18 thin section at various resolutions
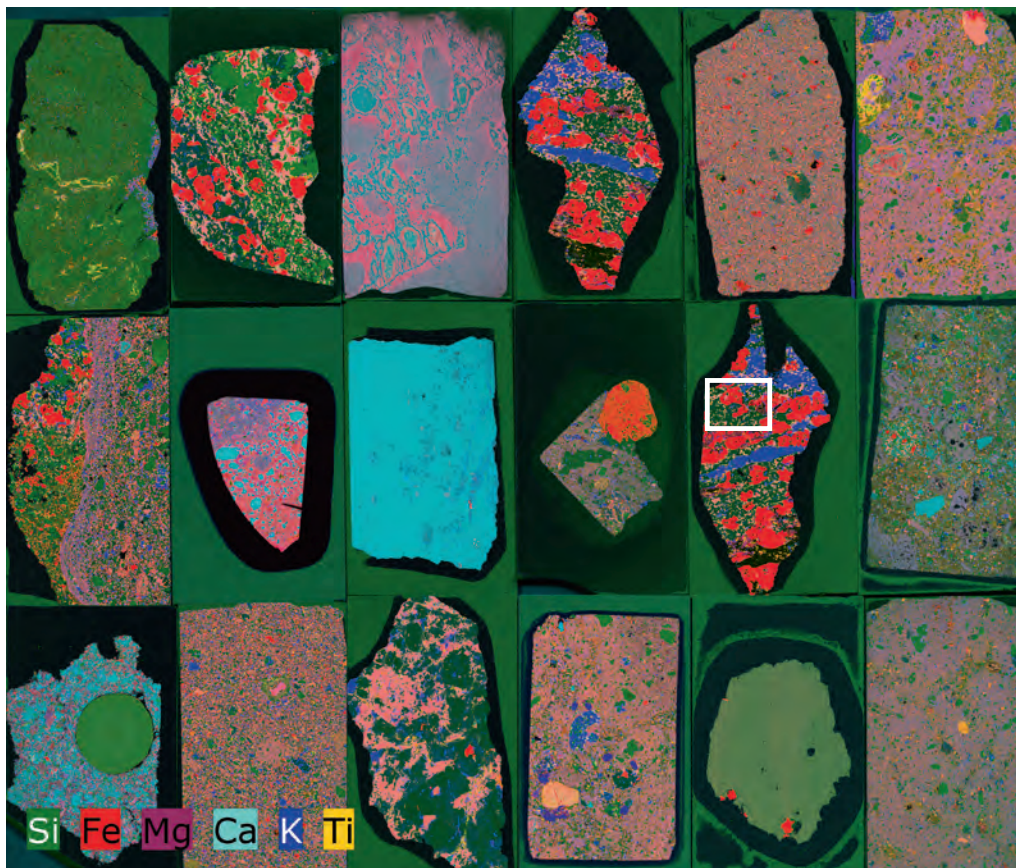
Up to 18 standard sized thin sections can be placed on the sample stage of the M4 TORNADO to be measured in one run. After the scan, the individual samples can be cut out from the data set and saved. With the latest software version V1.6 maps with over 35 million pixels can be acquired. A sample area of 166 mm x 140 mm can be measured with high quality that reveals structures (i.e., cracks) of 30 µm as to be seen in the individual images showing details of the measurement area marked with the white rectangle.

830 x 700 pixel, 200 µm step width

3320 x 2800 pixel, 50 µm step width

6640 x 5600 pixel, 25 µm step width

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