Needles in Haystacks: Using Fast-Response LA Chambers and ICP-TOF-MS to identify Asbestos Fibres in Malignant Mesothelioma Models

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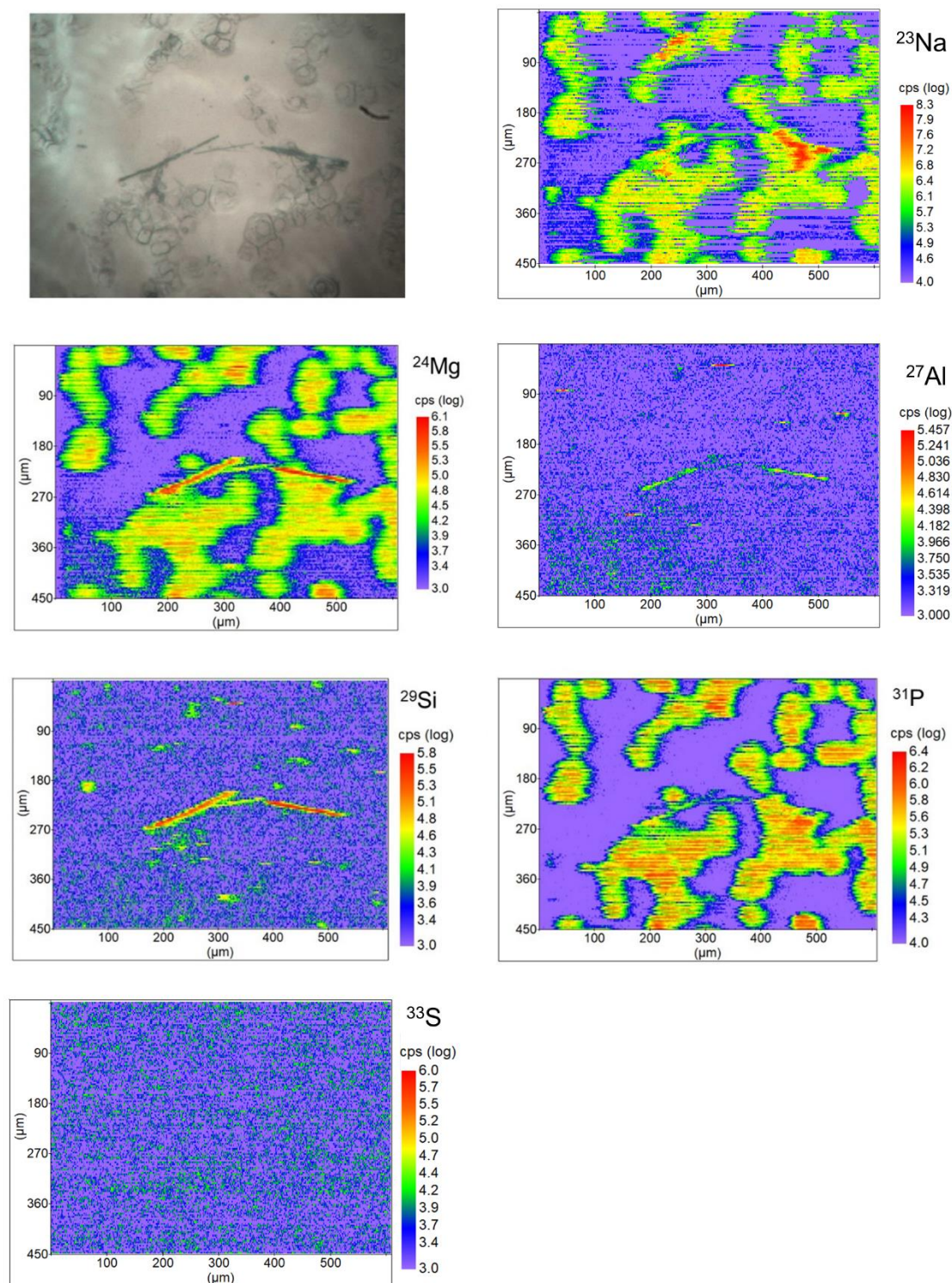[b]Department of Biosciences and Chemistry, Sheffield Hallam University, S1 1WB, UK.
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## Electronic Supplementary Information

Supplementary Figure 1. LA-ICP-MS imaging of MSTO-211H cells spiked with a mixture of actinolite and amosite fibres was performed using a sector-field instrument in *FastScan* mode. A microscopic image of the sample is shown on the top left, with the corresponding ^{23}Na, ^{24}Mg, ^{27}Al, ^{29}Si, ^{31}P and ^{33}S distribution shown in the lower panels. ^{40}Ca and ^{56}Fe were unable to be measured in this mode because they exceeded 40% of the parked mass of the magnet.
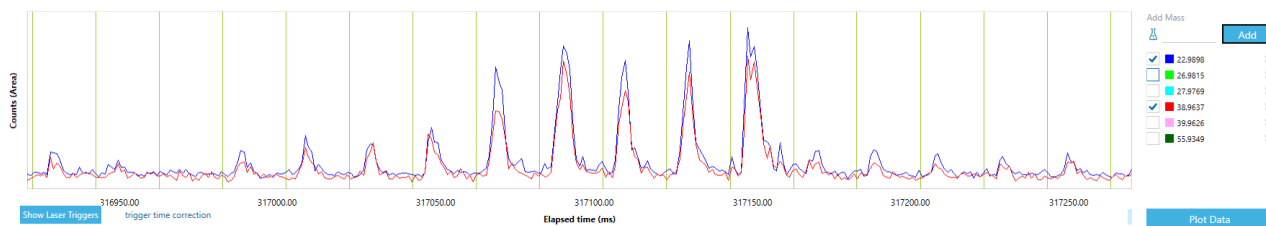
Supplementary Figure 2. Screenshot showing a segment of the raw data. ^{23}Na and ^{39}K signals, shown in blue and red respectively, are displayed with data points at 1 ms intervals. The green line shows the position of the trigger signals. The data in the window between each of these lines was averaged and background subtracted to provide a data point for an individual pixel in the final image. The peaks are baseline resolved at 50 Hz, so the pixels can be directly associated with each laser shot.
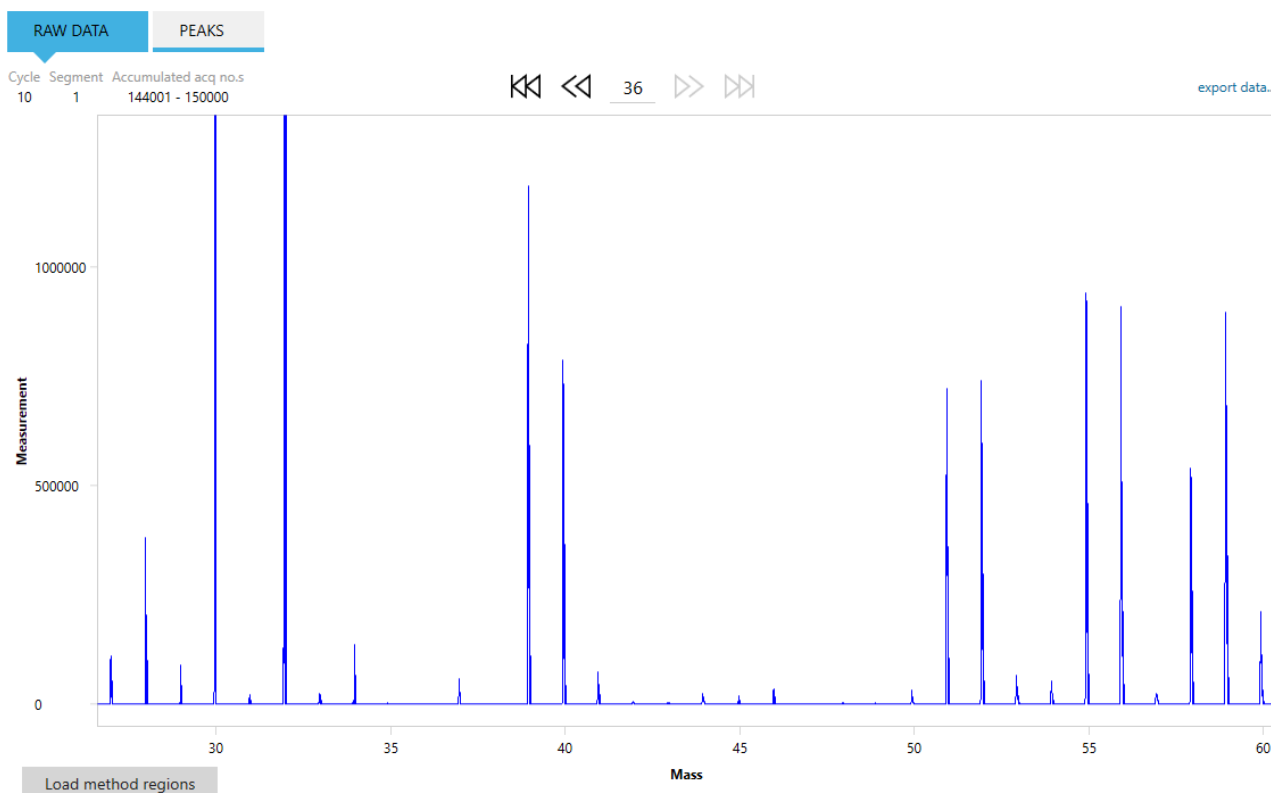
Supplementary Figure 3. Screenshot showing a raw spectrum of 12.5ppb mixed elements for a 0.5sec acquisition. This shows that the K, Ca and Fe isotope ratios are not corrupted and that the mass 28 is silicon contamination in the blank.
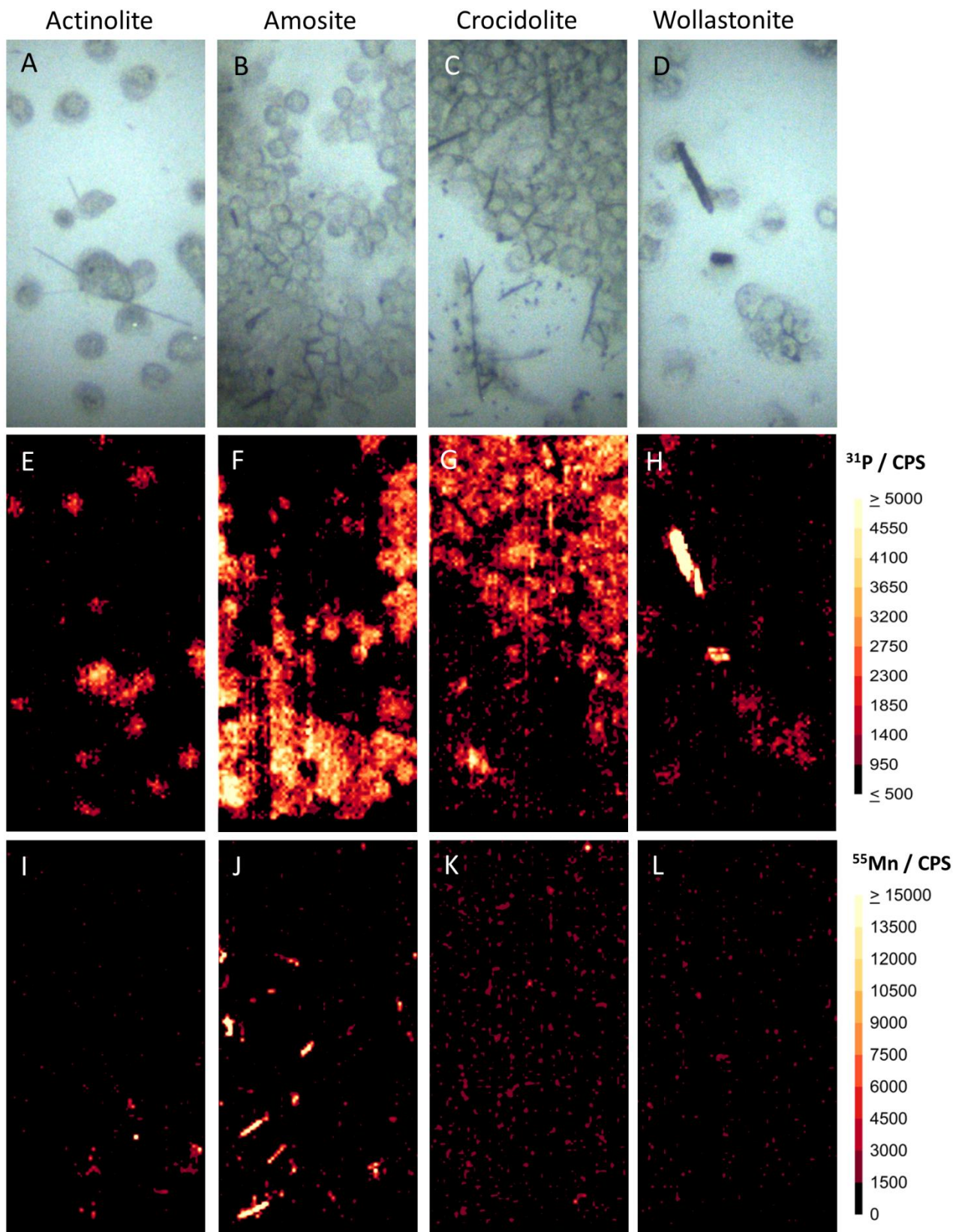
Supplementary Figure 4. Microscopic images of MSTO-211H cells spiked with actinolite, amosite, crocidolite and wollastonite fibres (panels A, B, C and D respectively). LA-ICP-MS images showing the phosphorus and manganese distribution across the samples are shown in panels E-H and I-L respectively. A 400 x 200μm area was sampled for each fibre type. Although not in the nominal formula of the fibres studied here, manganese has been known to substitute into some amphiboles, as was observed for amosite (panel J).
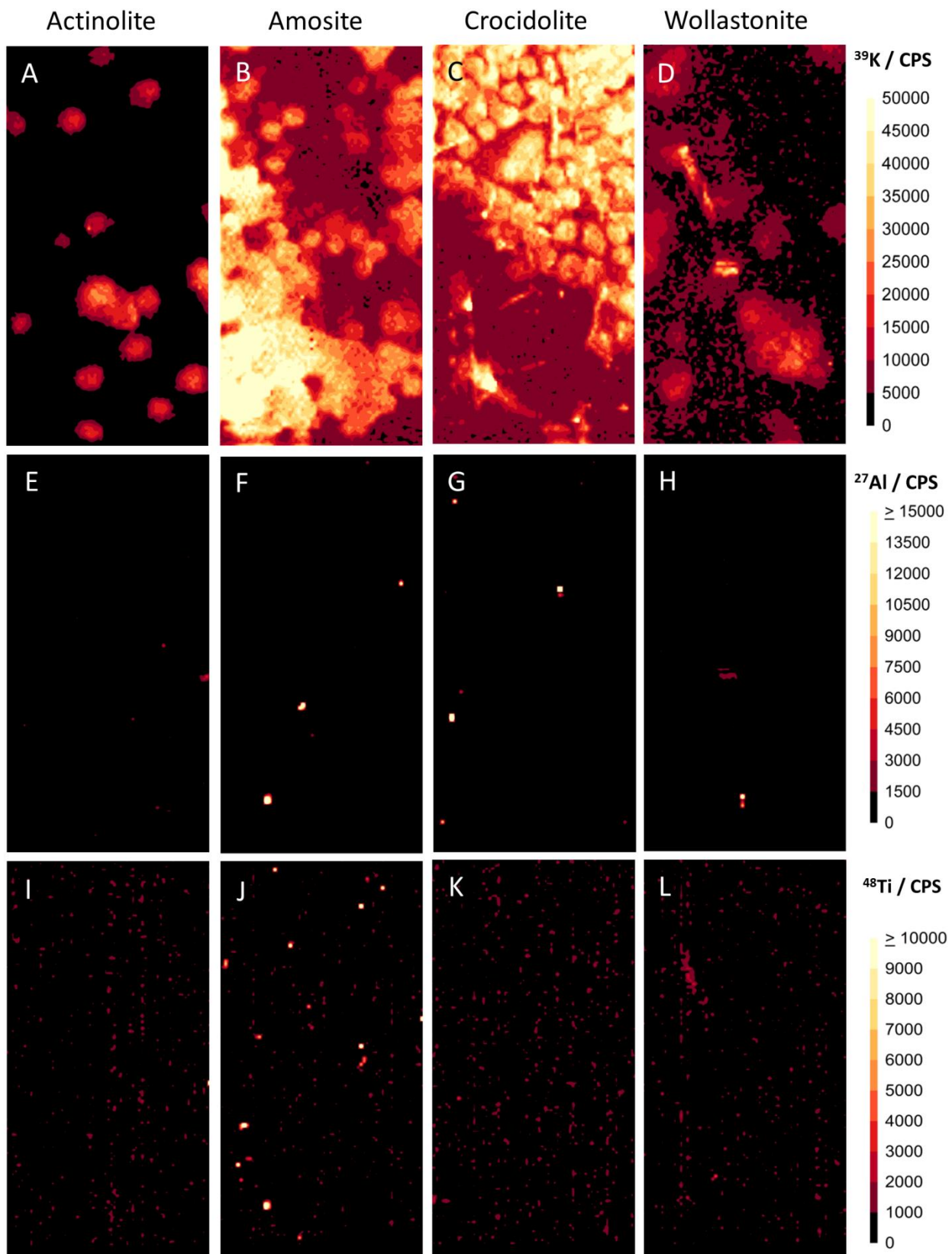
Supplementary Figure 5. LA-ICP-MS images of the cell samples shown in panels A-D of Supplementary Figure 4 and Figure 1 of the main paper, showing the potassium (A-D), aluminium (E-H) and titanium (I-L) distribution across the samples. A 400 x 200µm area was sampled for each fibre type. The potassium signal shows the location of cells in the images. Aluminium and titanium were potentially of interest because they have been known to substitute into some amphiboles, but that was not observed here.