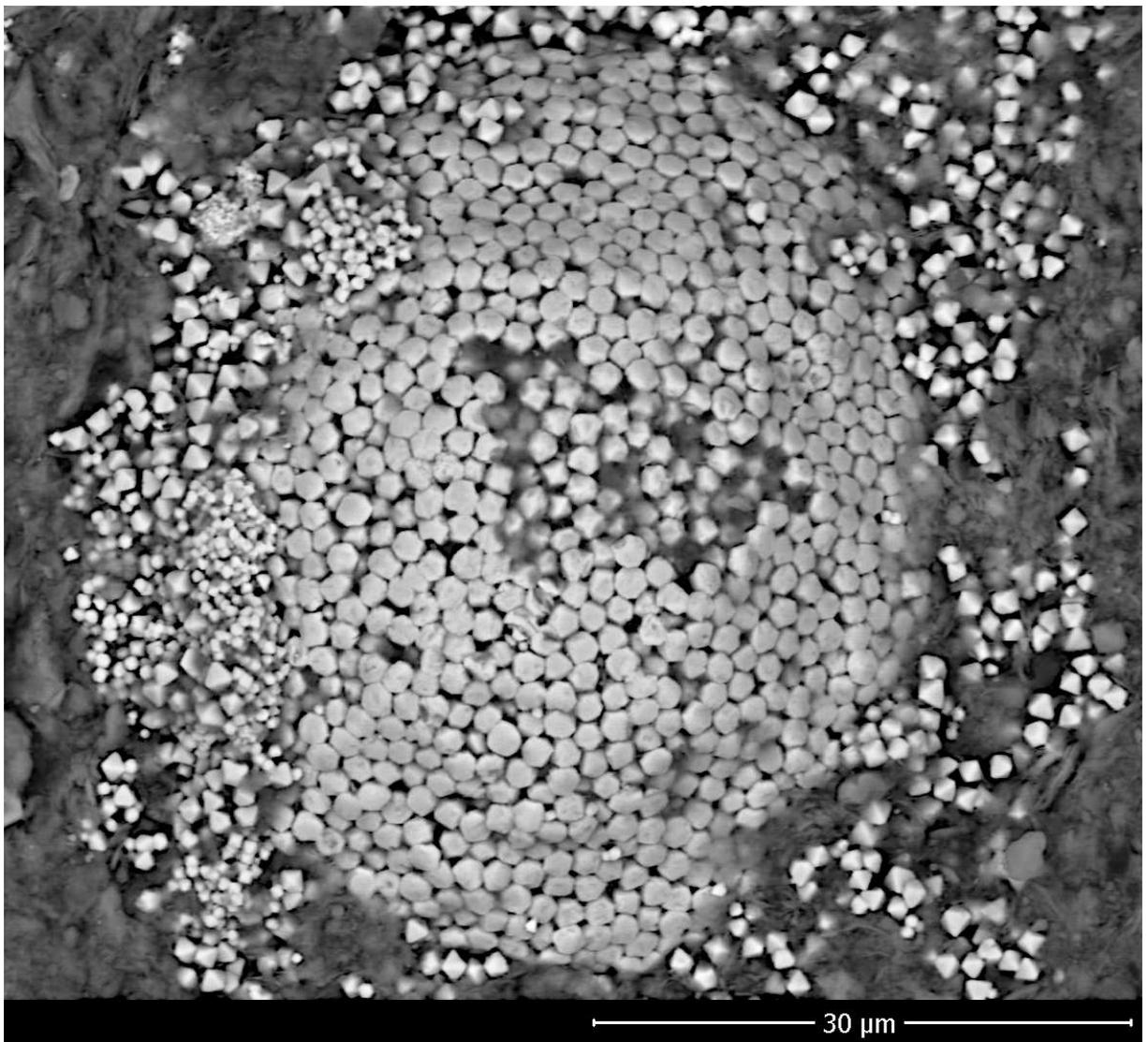


SEM Nano

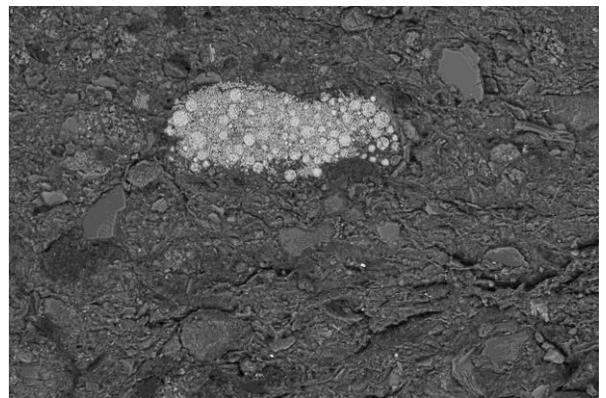
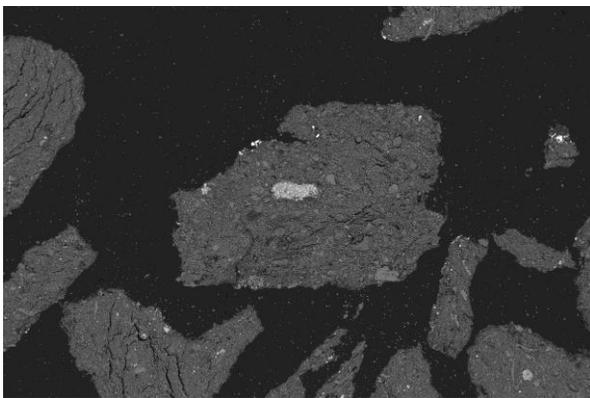
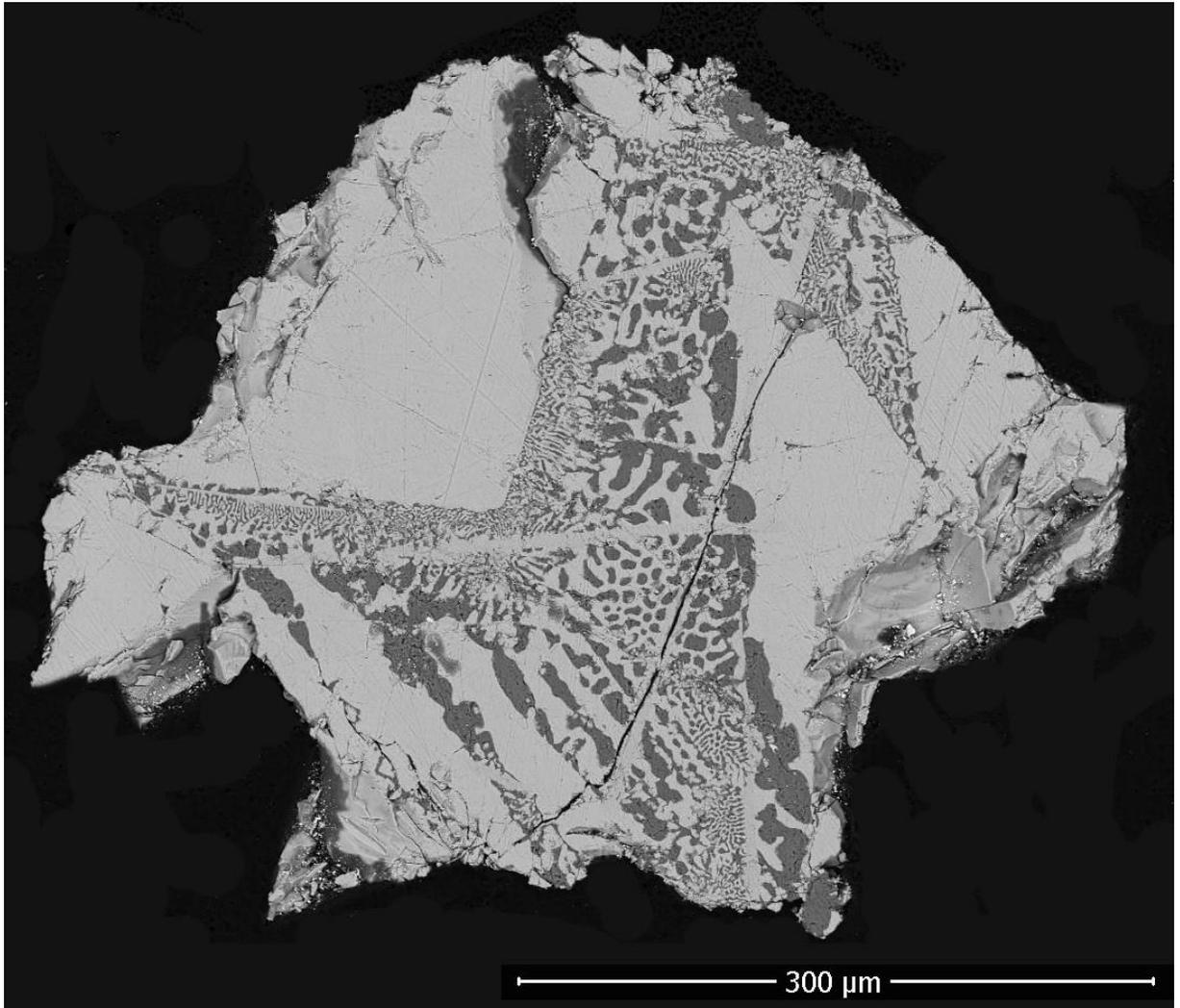
Rocks at nano-scale

Our scanning electron microscope (SEM) service provides nanometre imaging in backscatter electron (BSE) and secondary electron (SE) modes. It is ideal for when micron-scale is too coarse and a greater amount of information is required on the pore spaces and the clay minerals.



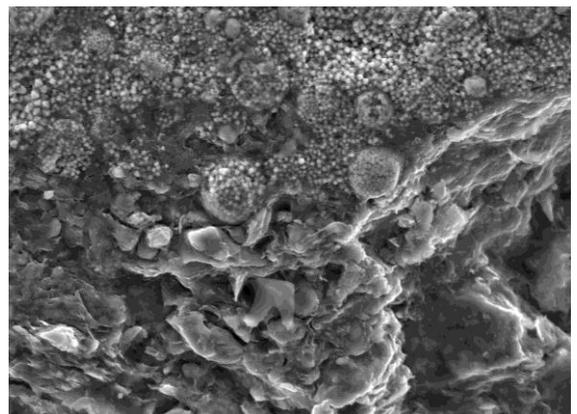
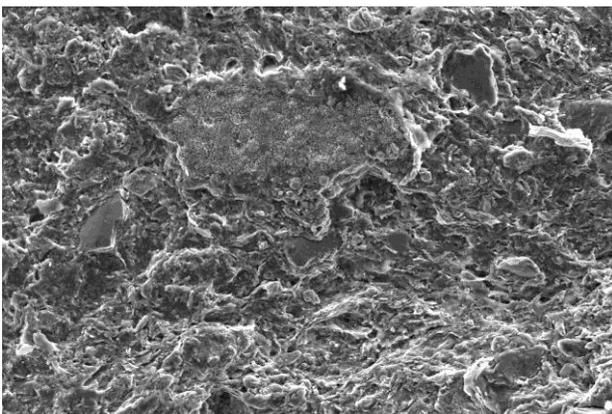
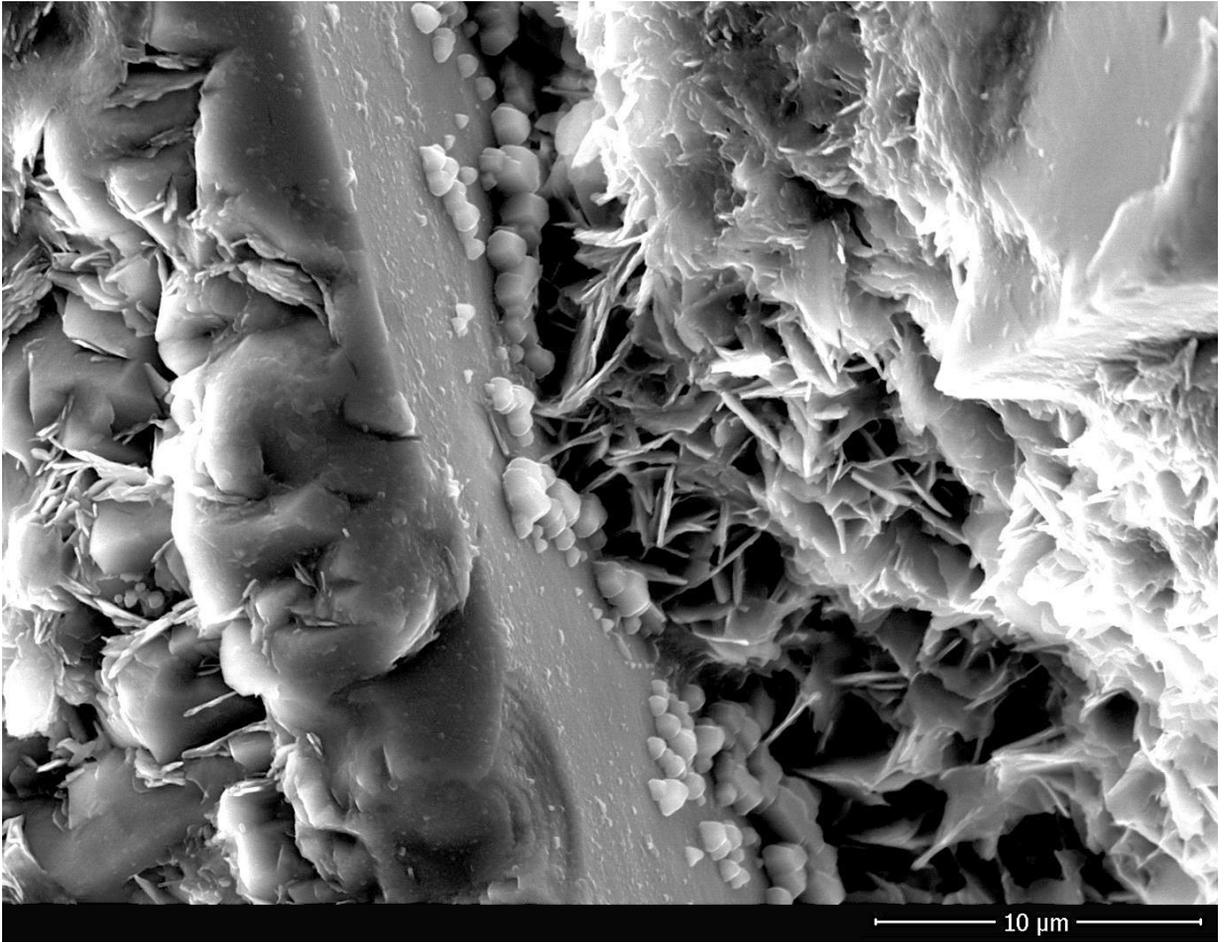
BSE scan image at 5000x magnification, showing the cubic crystals within a pyrite (FeS_2) framboid, with individual crystals around $1 \mu\text{m}$ across.

Backscatter Electron Images



BSE collect high resolution images from the region below the surface of the sample by bombarding it with a beam of high-energy electrons. Imaging depends on the atomic weight of the elements present, with the intensity of the image directly proportional to the mean atomic number of the mineral. The stronger the energy of the beam, the deeper the region of investigation.

Secondary Electron Images



SE uses high-energy electrons to collect high resolution images of the surface of a sample, rather than light rays as used in traditional optical mineralogy. A focused beam of energy is used to scan the sample which causes the excitement of atoms and the release of secondary electrons. These are detected and converted into images which provides information about the surface morphology and topography.

Deliverables

BSE Images	Up to 10 images over a range of resolutions, including 100x, 500x, 2500x and 10000x resolution images
SE Images	Up to 10 images over a range of resolutions, including 100x, 500x, 2500x and 10000x resolution images
Mineral phase evaluation	Subtle mineral phases can be identified due to mean atomic number distinguished to $\sim 0.1z$
Porosity evaluation	Micro porosity can be identified and evaluated



All SEM Nano scans are performed on our Quanta 650F FEG-SEM by Thermo Fisher Scientific, seen here in use at our lab at the Oxford Science Park.

v 1.0

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