

Supplementary material

Jarosite rich mineral crust on coastal cliffs in central Norway: Microstructural and geochemical investigations

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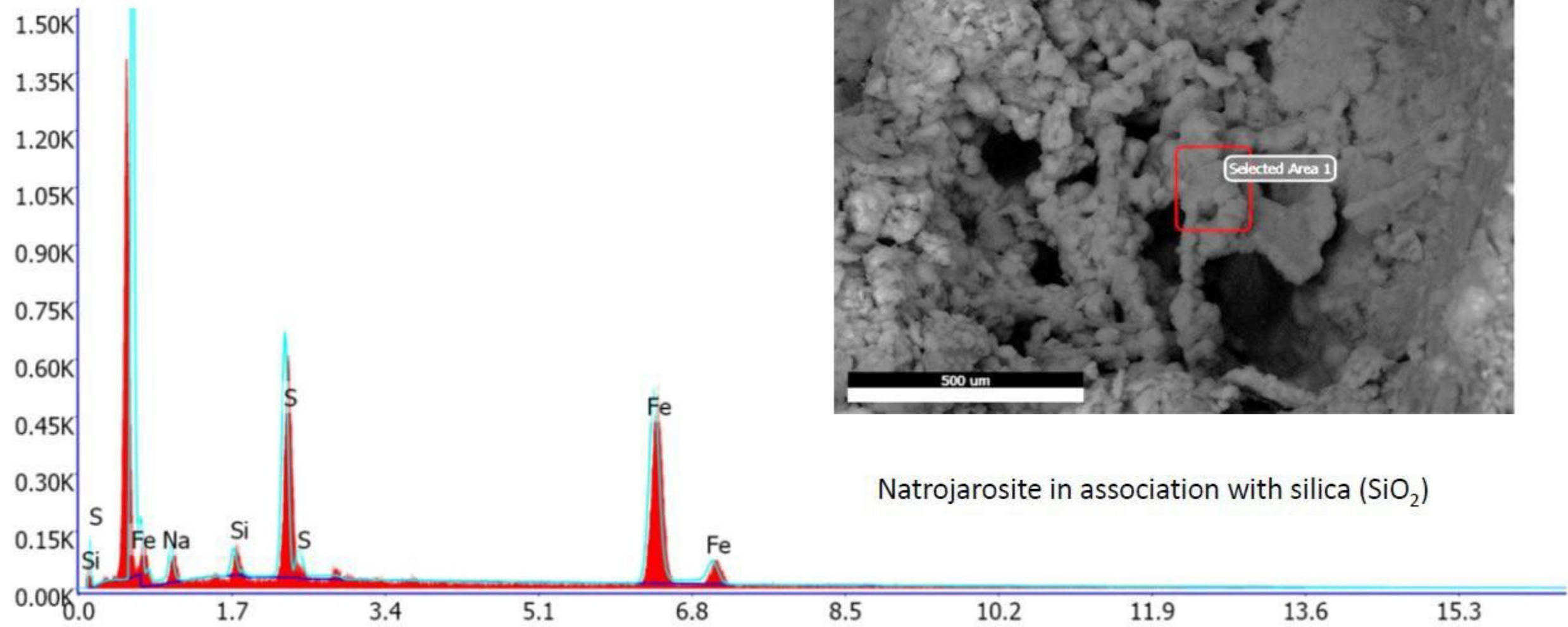
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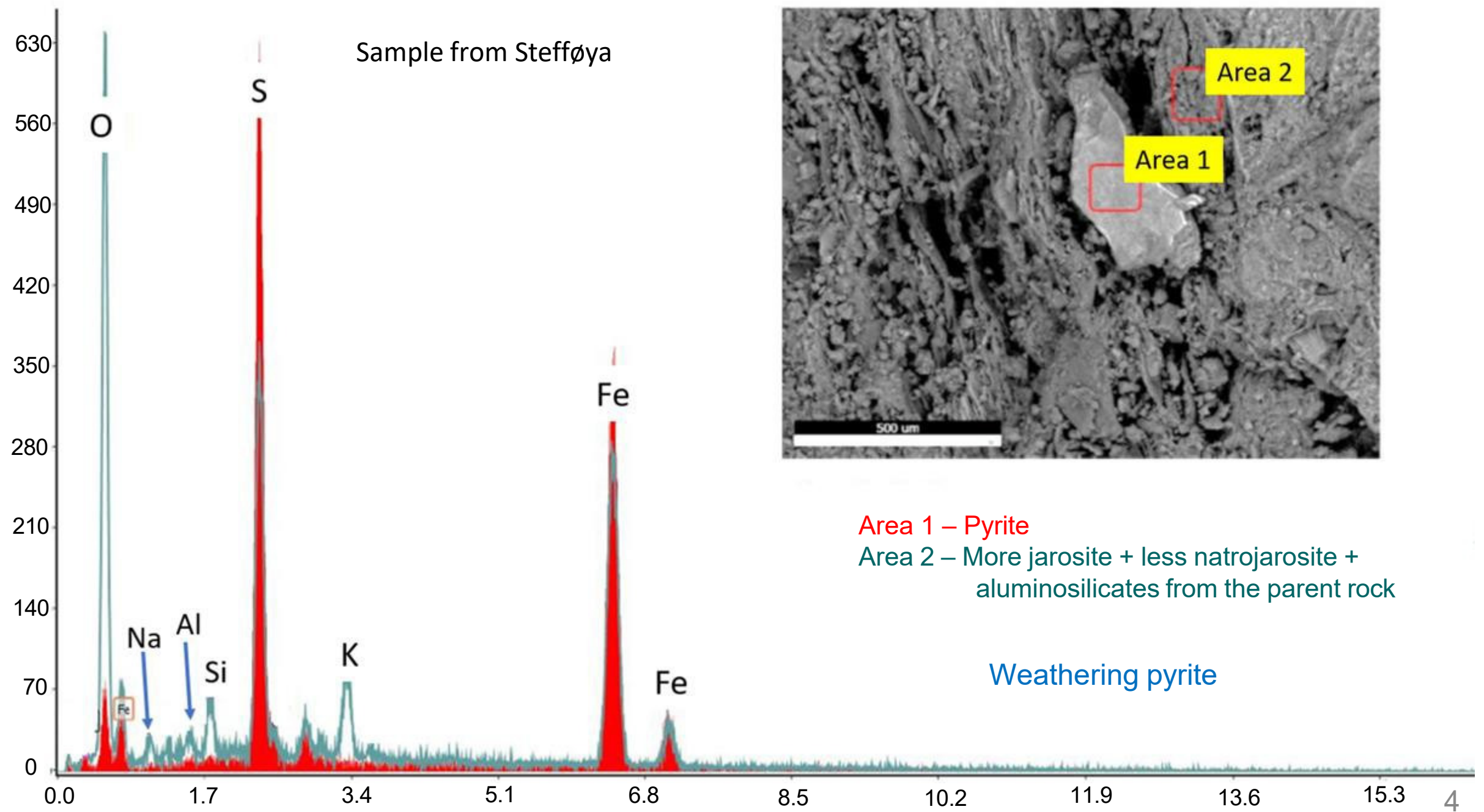
Supplement 1 (S1)

SEM-EDS results showing the possible co-existence of jarosite and natrojarosites. In some parts of the samples only jarosite is also indicated in others only natrojarosite.

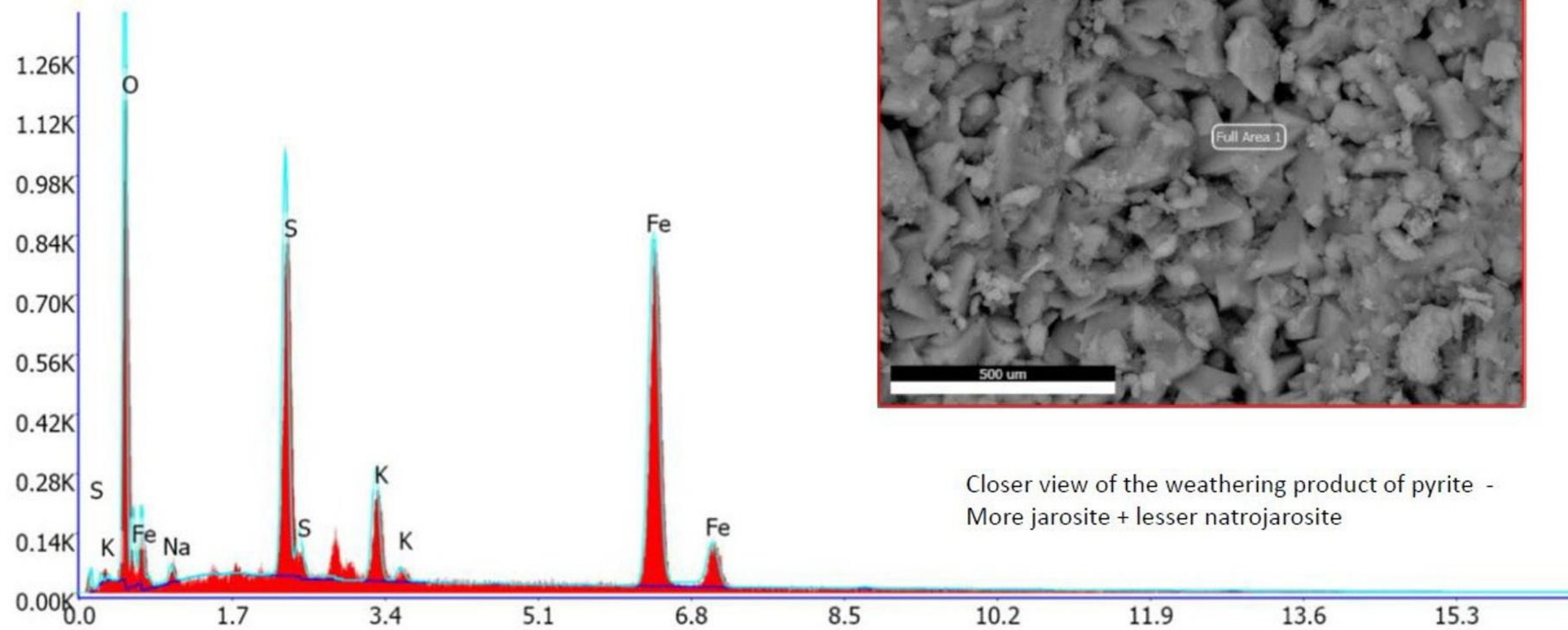
Weathering products of jarosite such as iron oxides, hydroxyoxides, silica, gypsum, etc. are shown by the results. So do the indications of weathering of pyrite and chalcopyrite resulting in jarosites.

Sample from Stefføya site

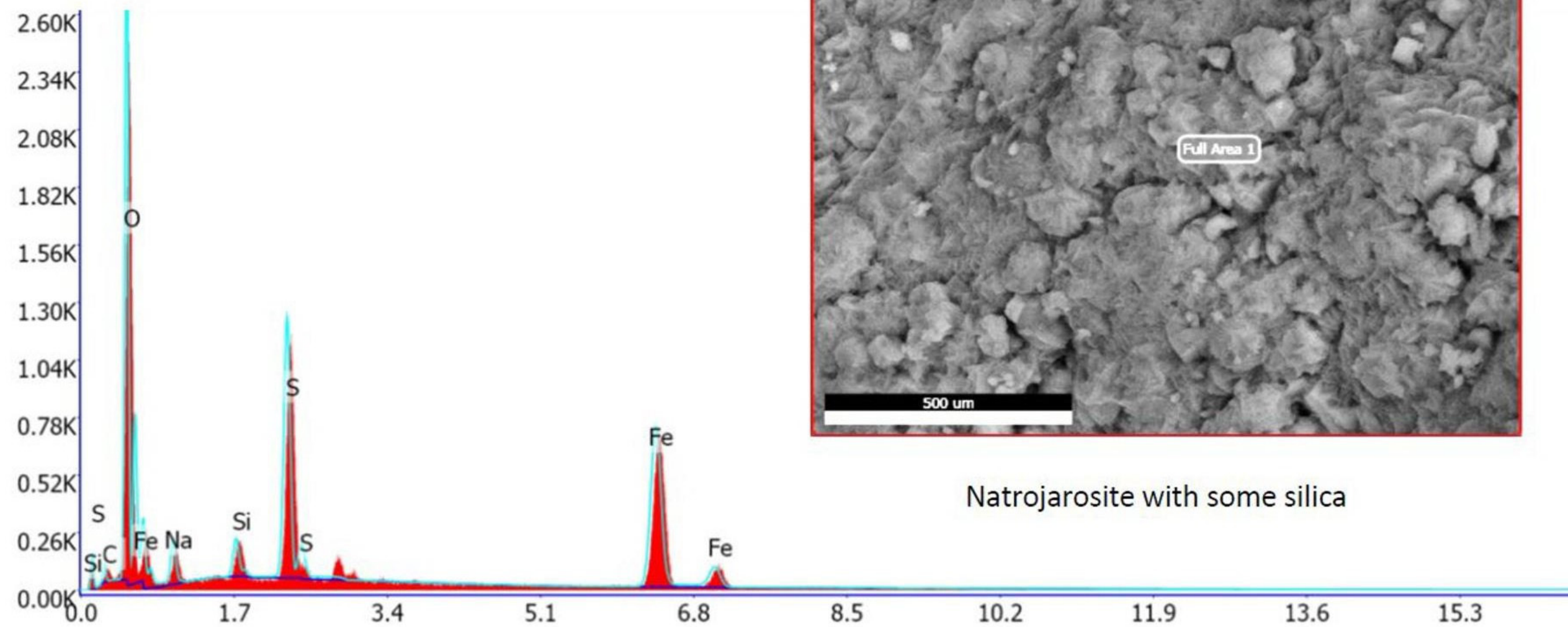


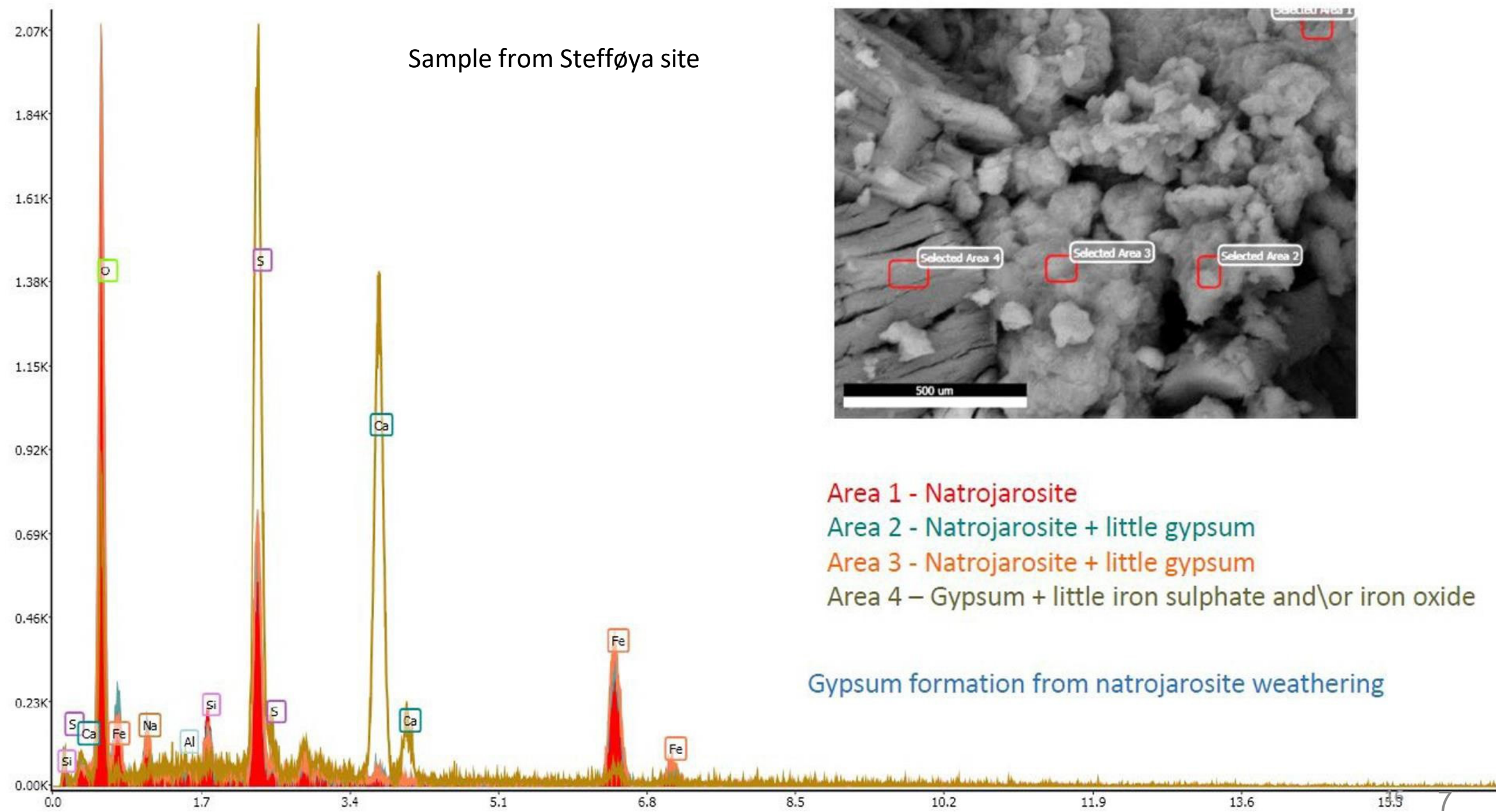


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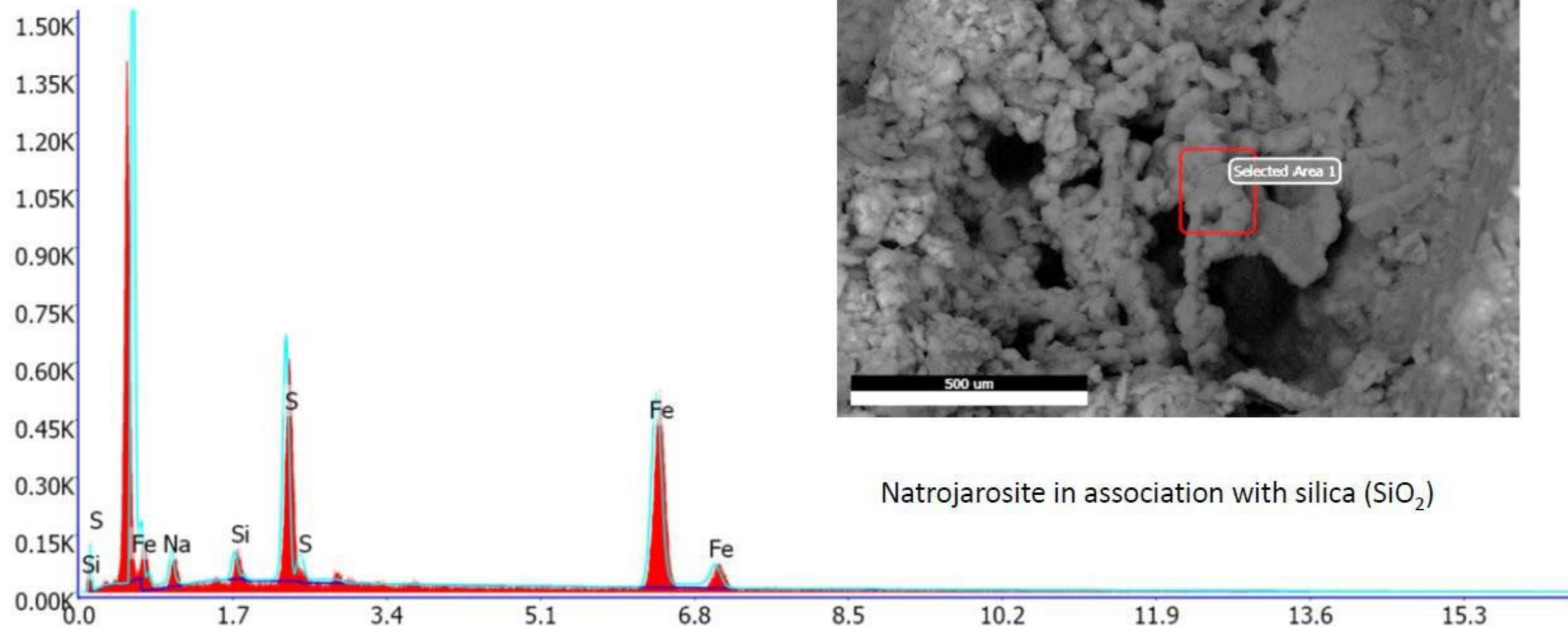


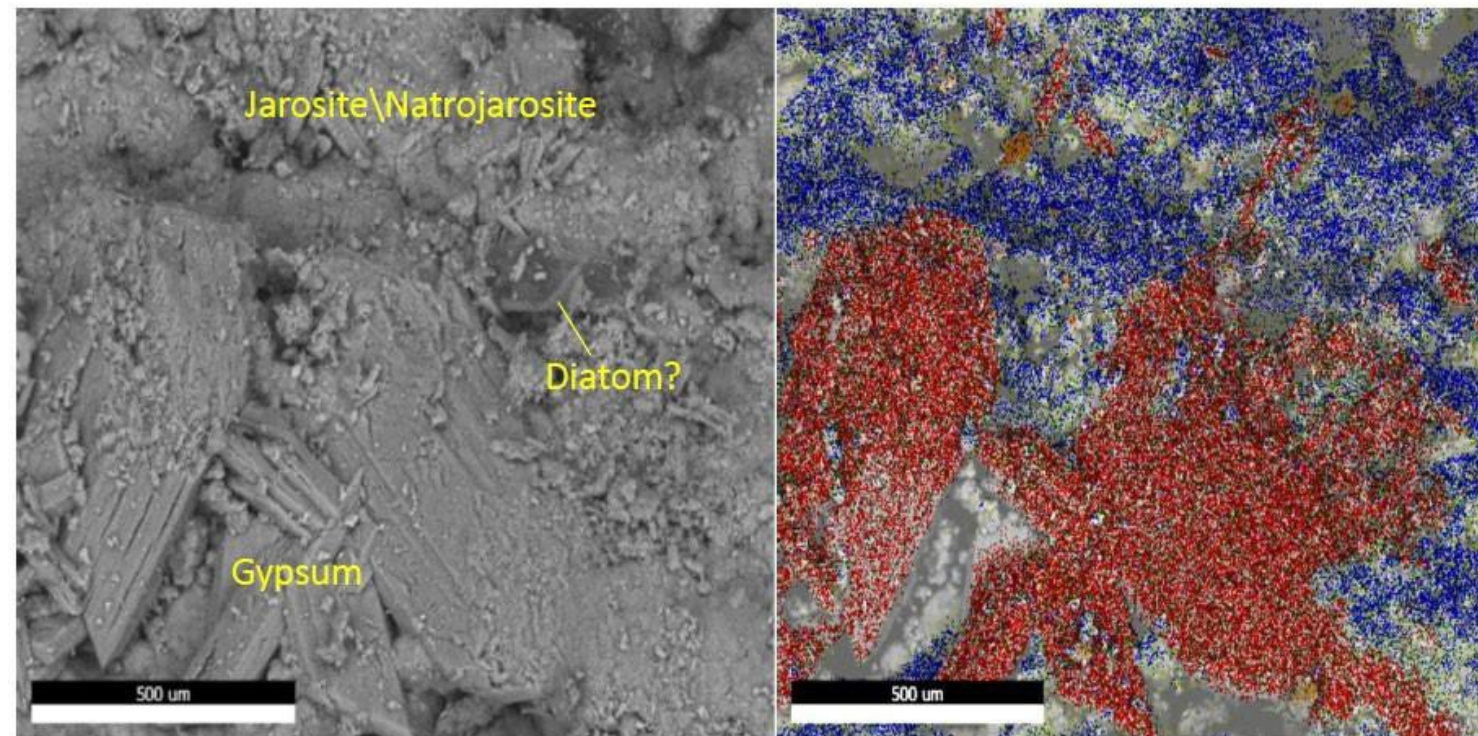
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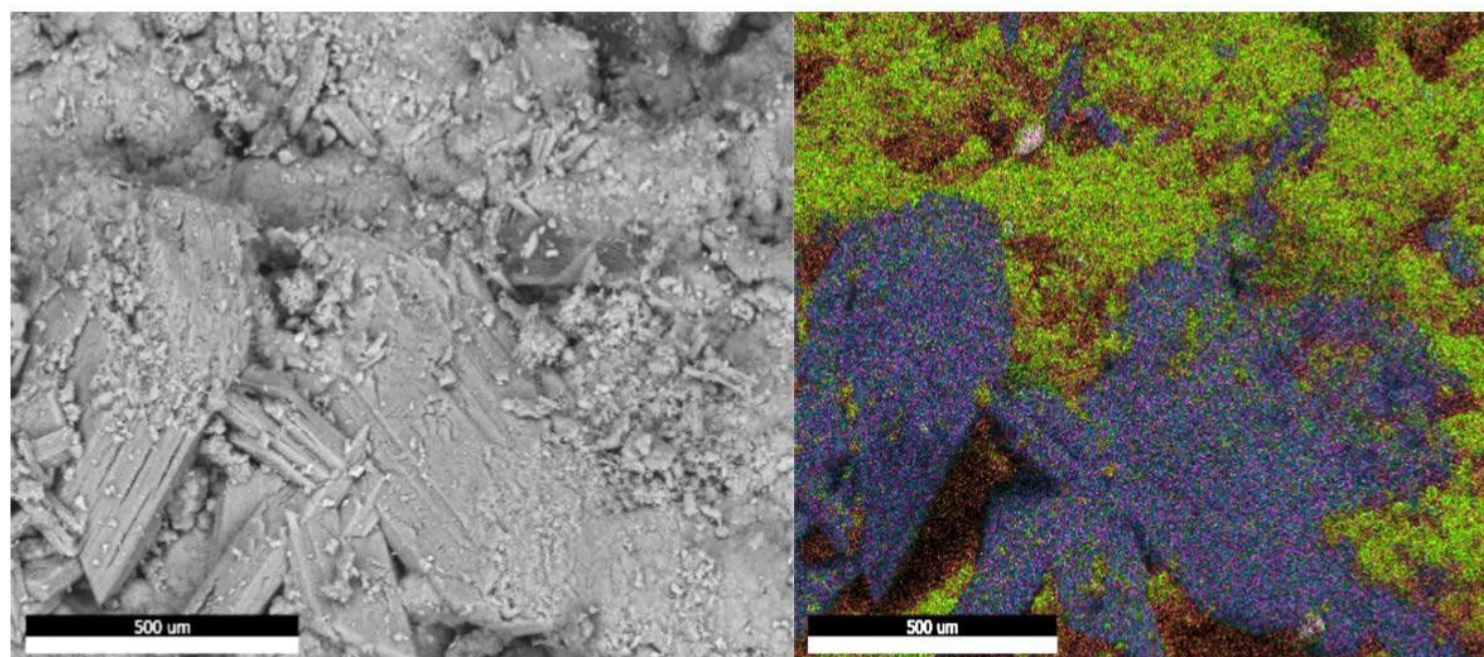


S3 smaller with white top





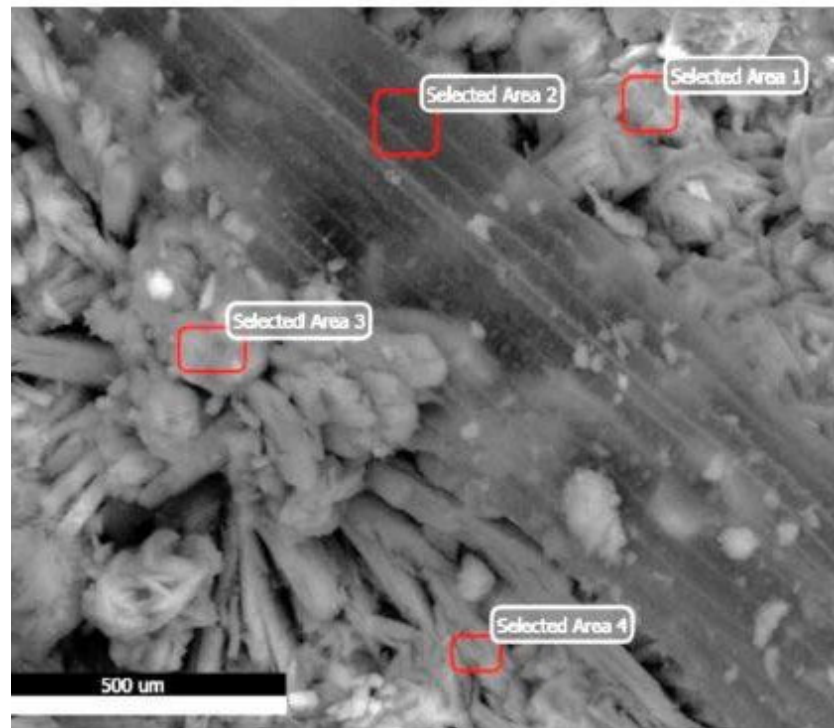
Phase mapping



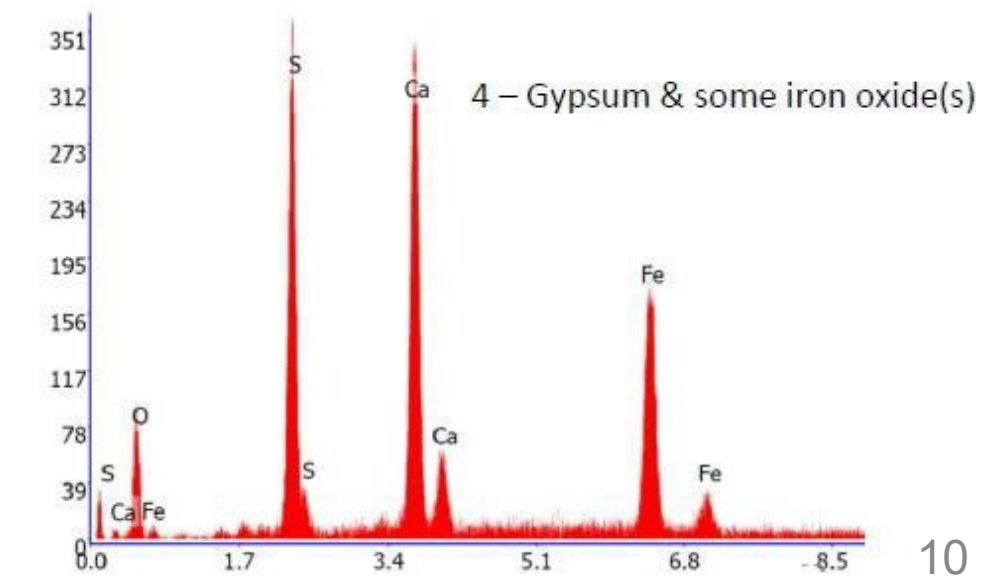
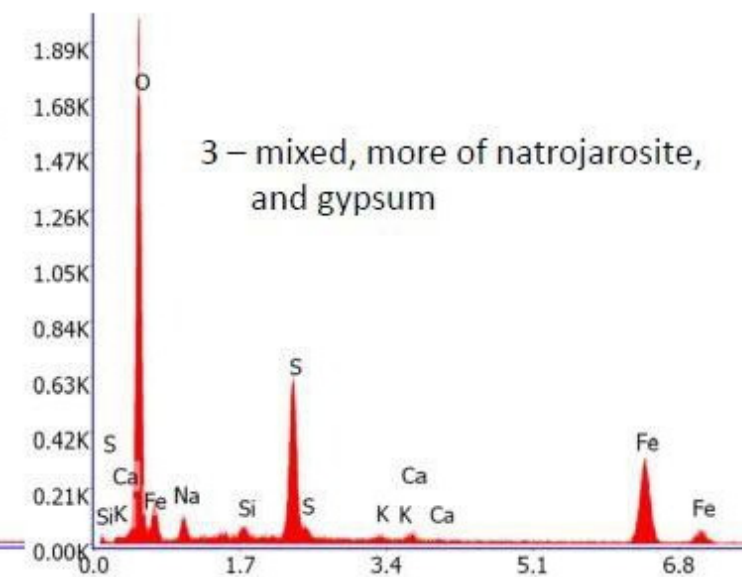
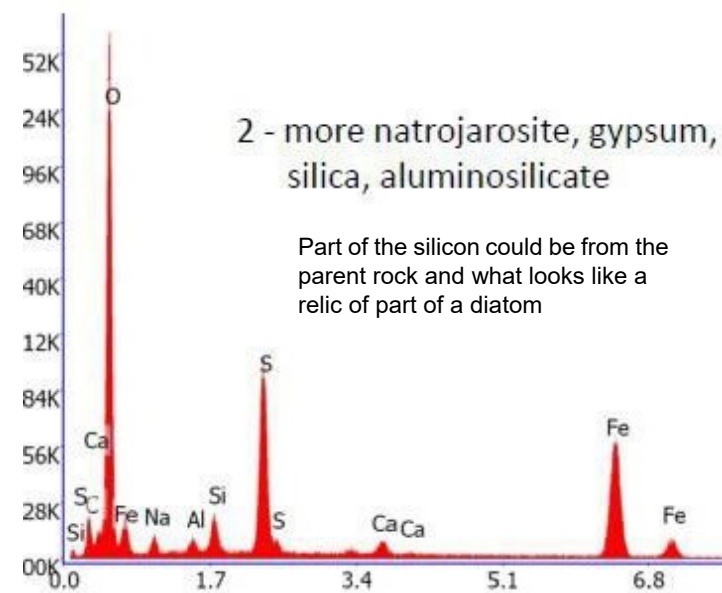
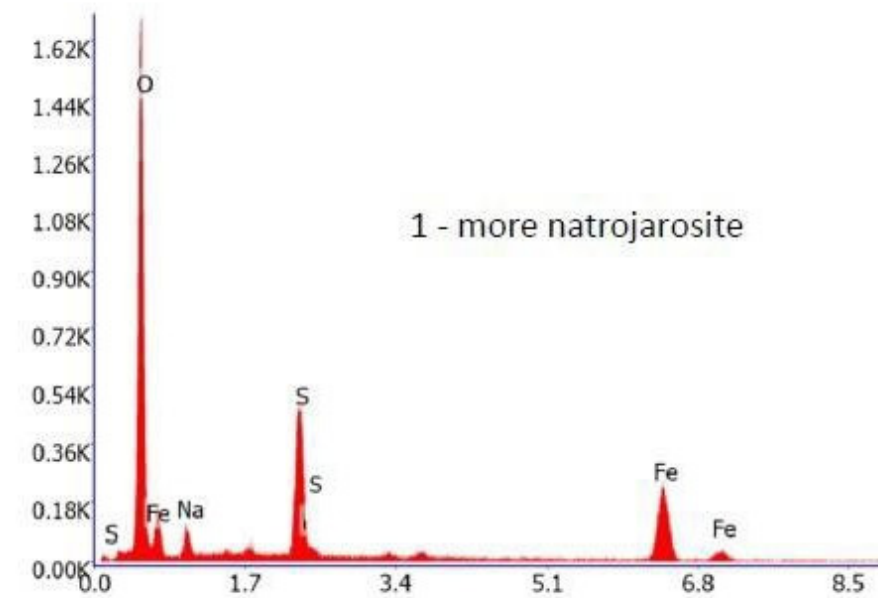
Elemental mapping



Sample from Stefføya site

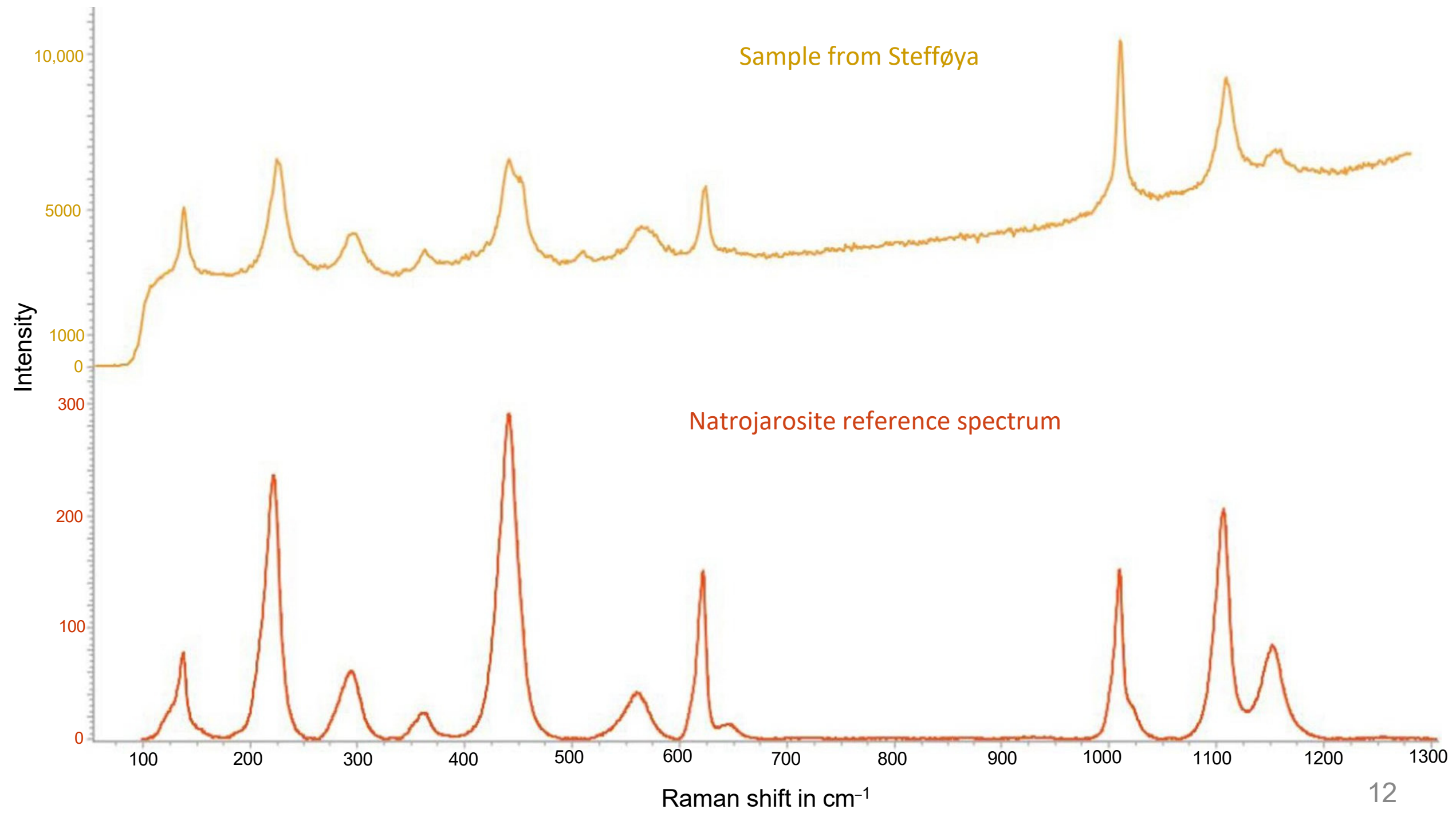


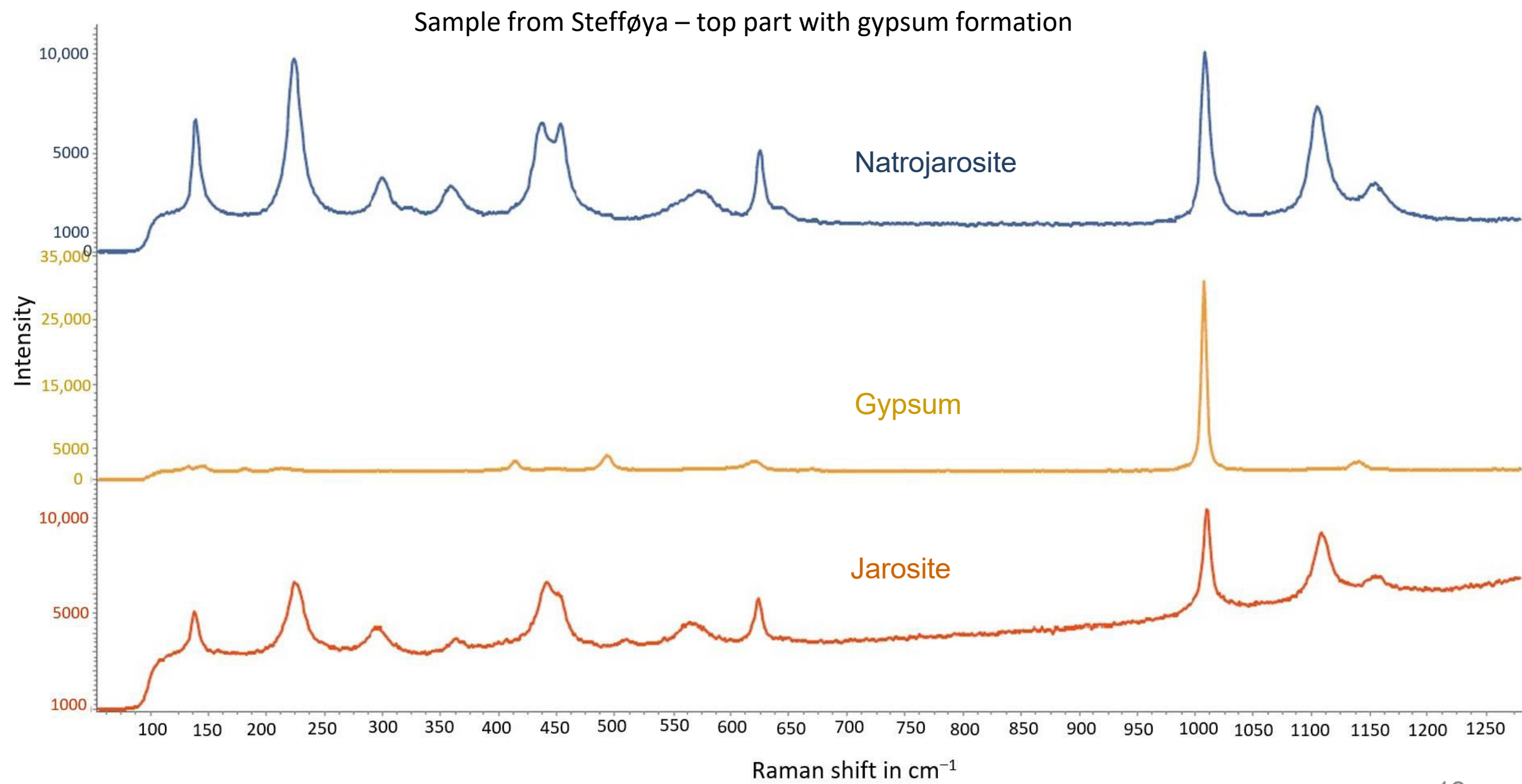
Sample from Stefføya site



Supplement 2 (S2)

Micro-Raman analysis indicated the sexistence of both jarosite and natrojarosite. Some of the weathering products are also confirmed by the molecular technique.

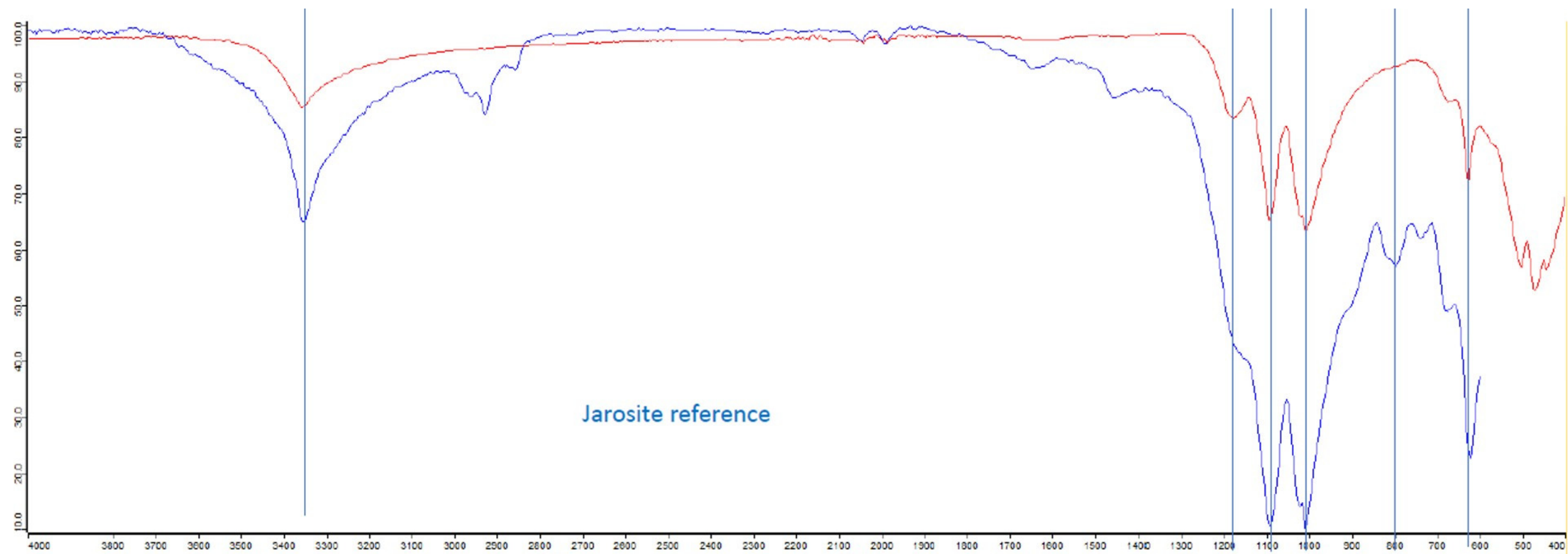




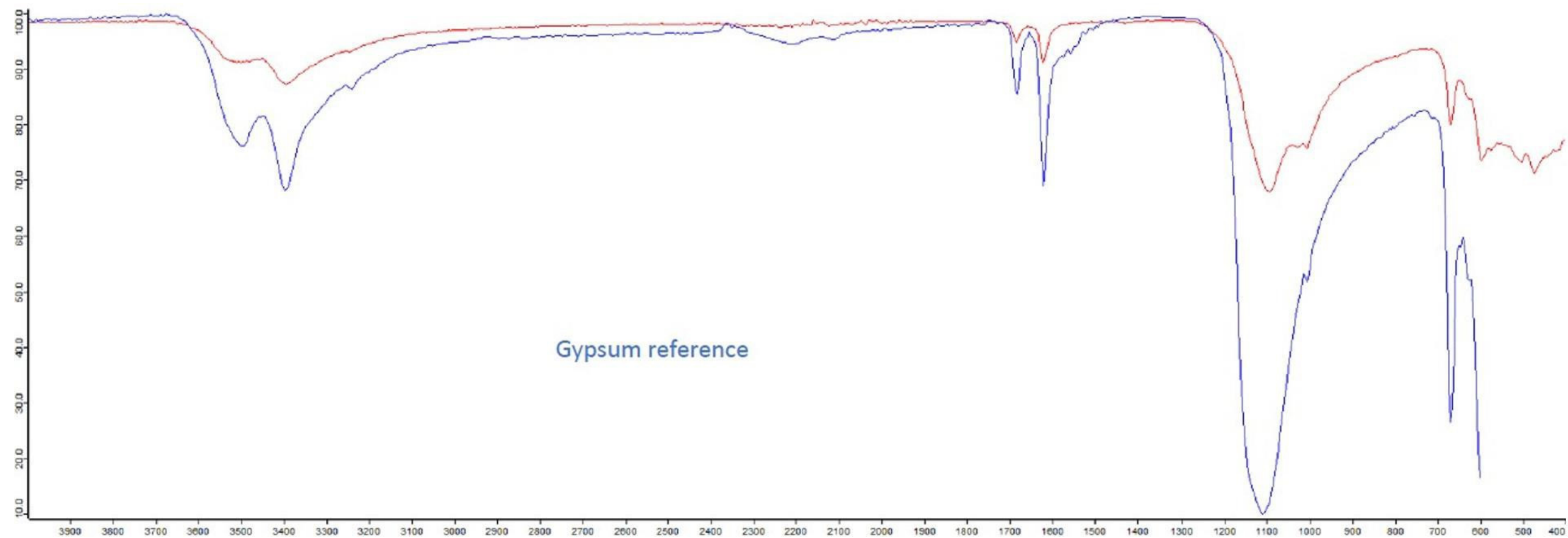
Supplement 3 (S3)

Just like Raman, FTIR analyses have also confirmed the formation of jarosite and the weathering products

Sample from Stefføya site

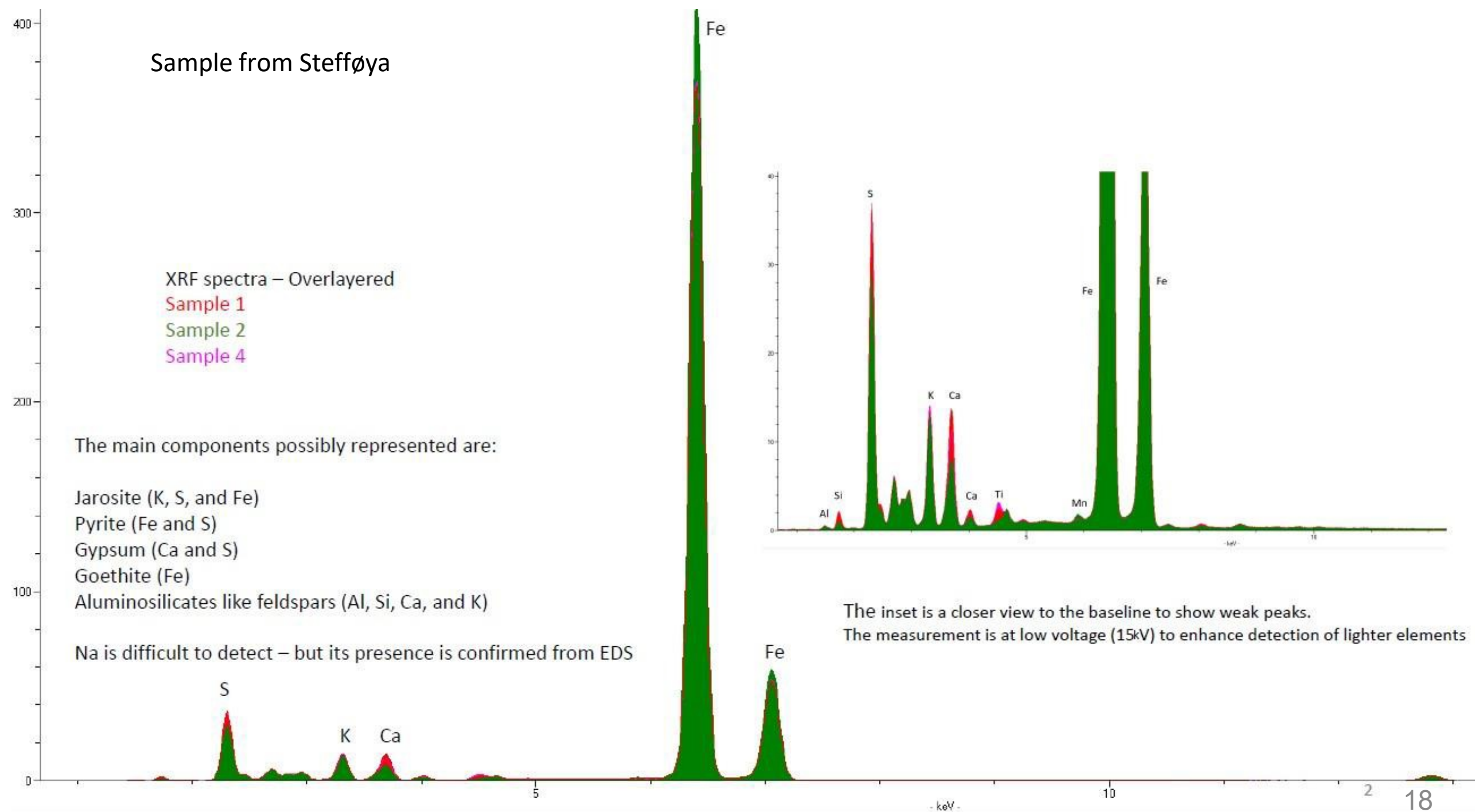


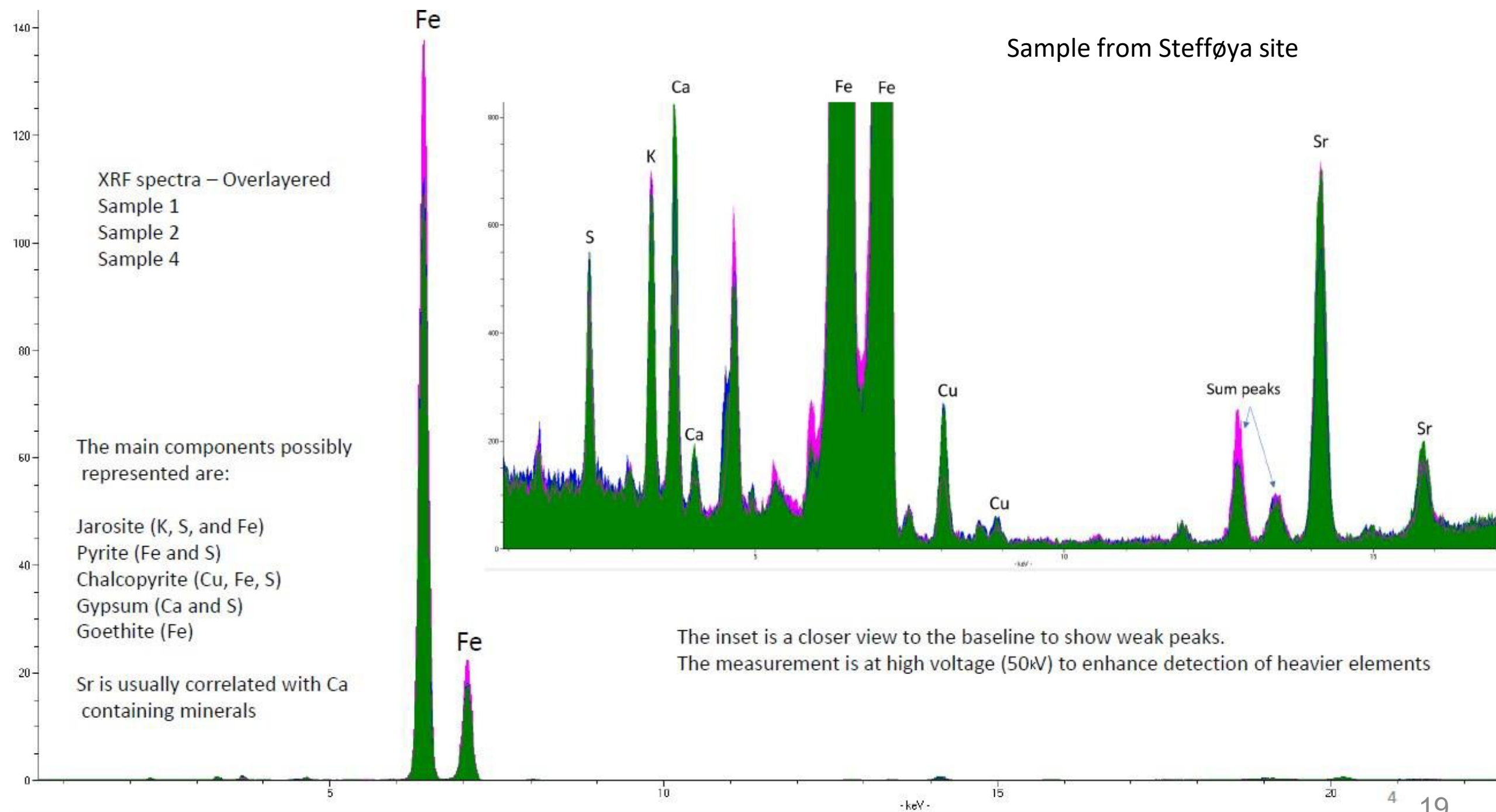
Sample from Stefføya site – top part of the sample - the gypsum formation



Supplement 4 (S4)

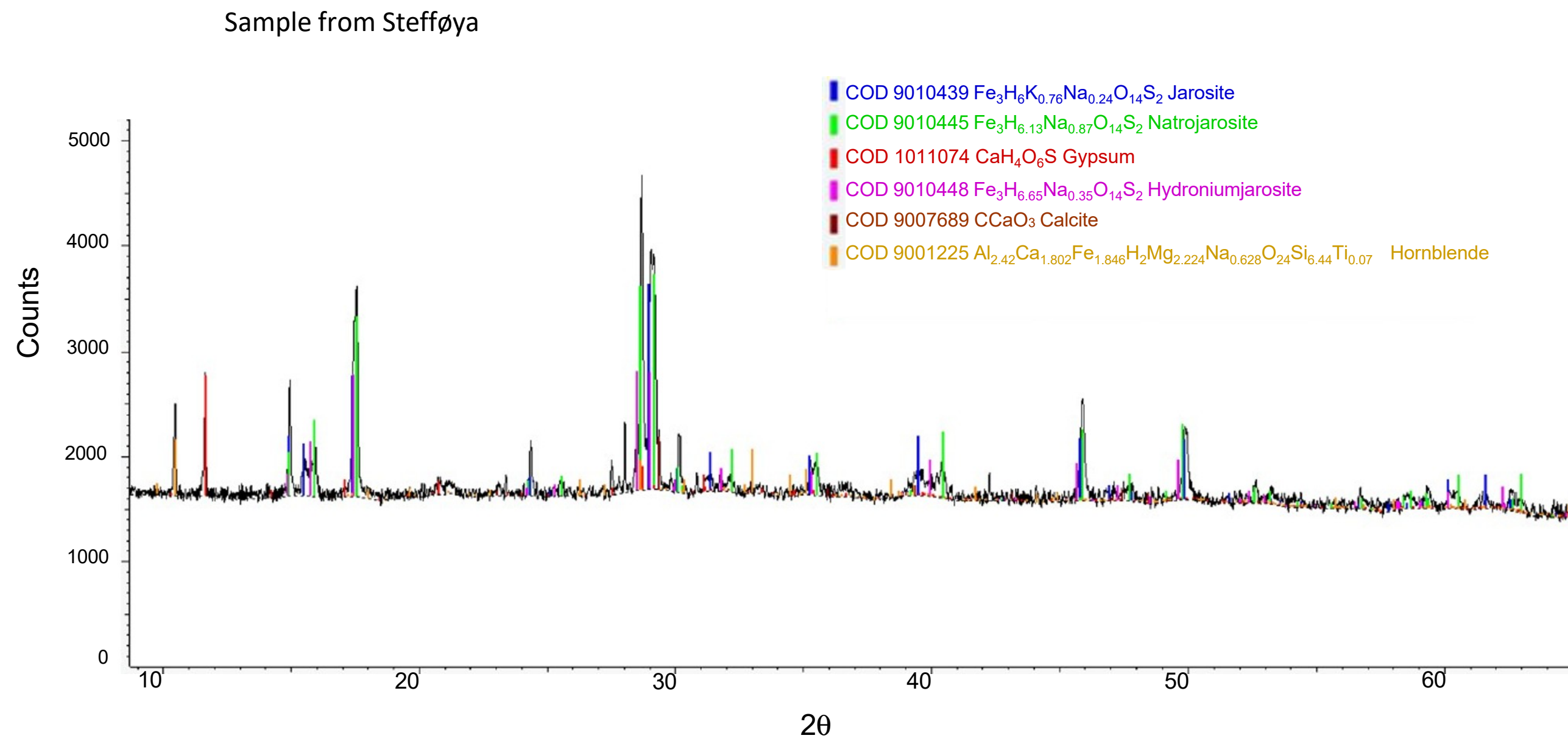
Portable XRF have shown the elemental composition of the jarosite samples.



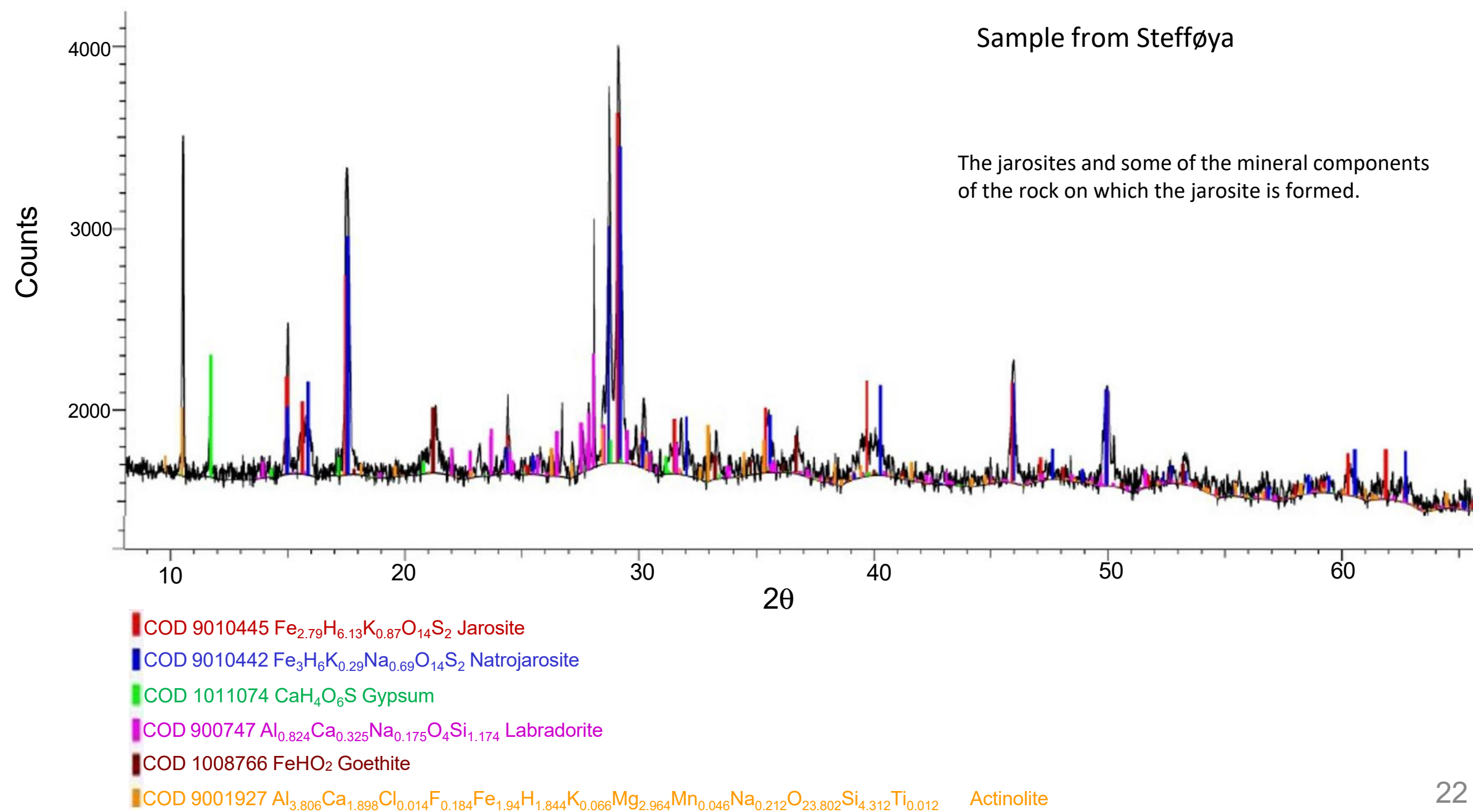


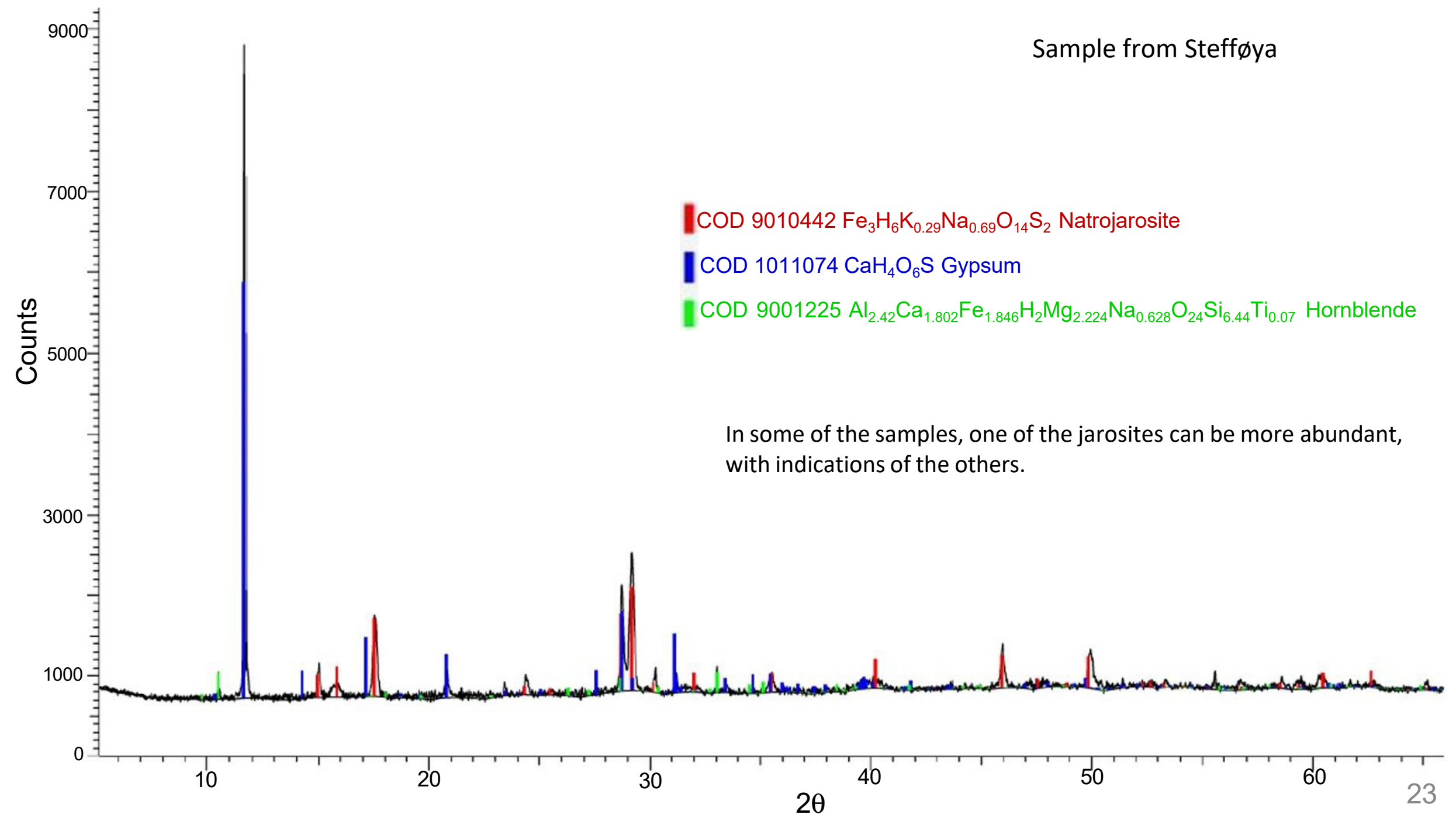
Supplement 5 (S5)

XRD analyses have also shown the co-existence of jarosite and natrojarosite in the samples analyzed. The weathering products like goethite and gypsum are also confirmed.



Jarosite and natrojarosite, with possible hydronium jarosite indicated. Note also similarities in the diffraction patterns of the three jarosites! SEM-EDS and Raman spectroscopy results also supported the co-existence of jarosite and natrojarosite in the samples.





Supplement 6 (S6)

Images of the sampling sites and their surroundings at different scales along with some of the micrographs from light microscopy used in the article

Stefføya site

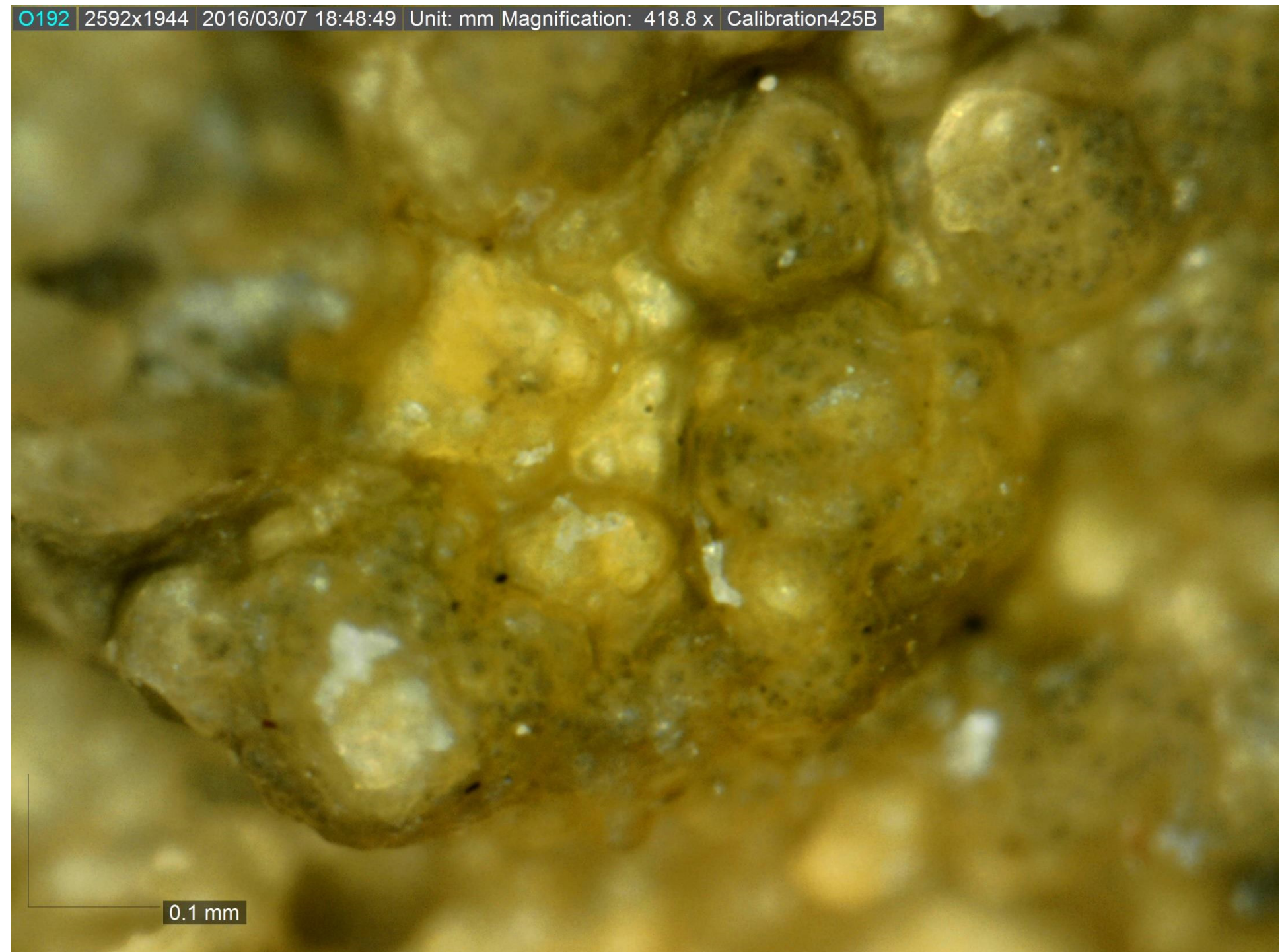


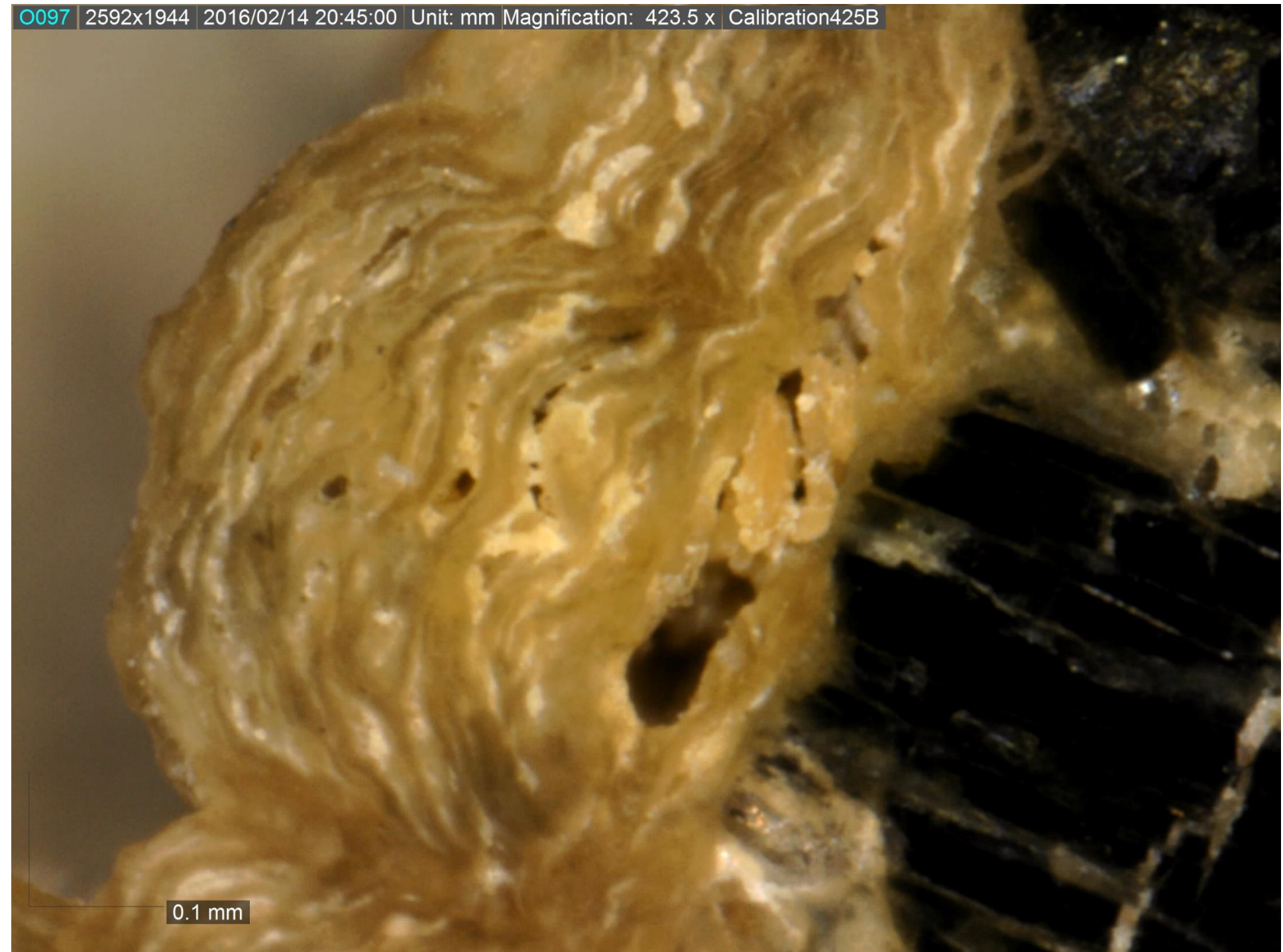


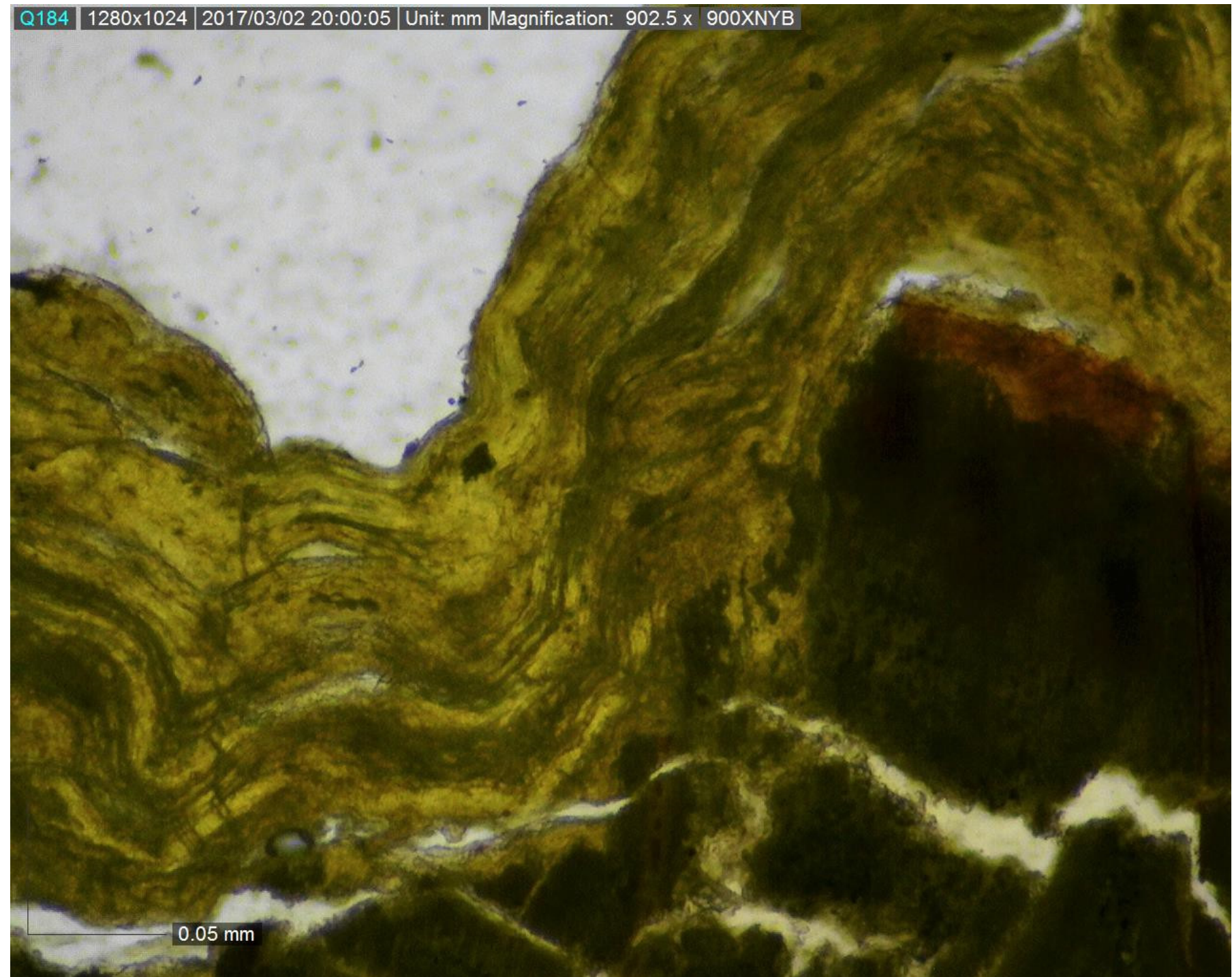


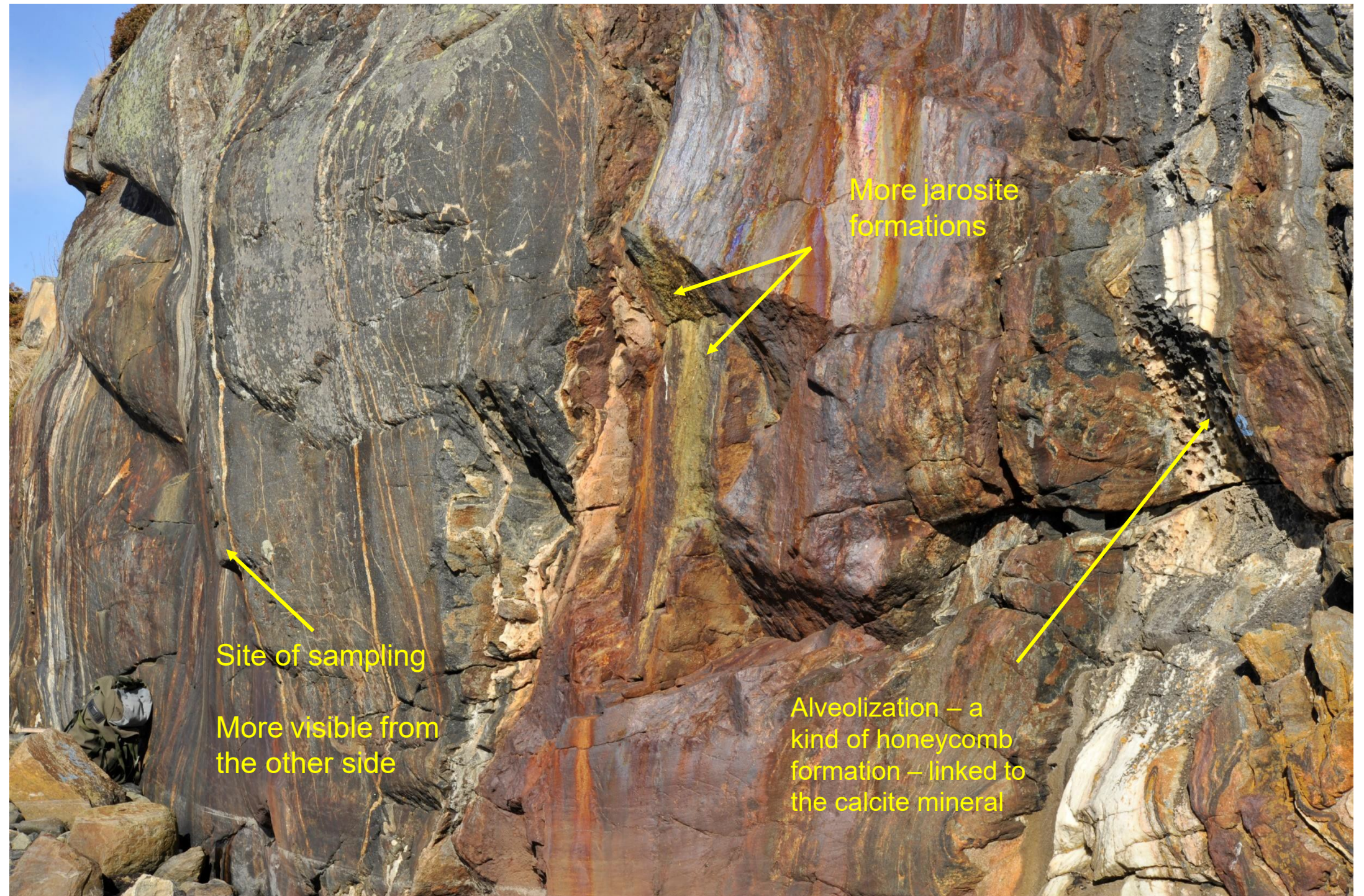


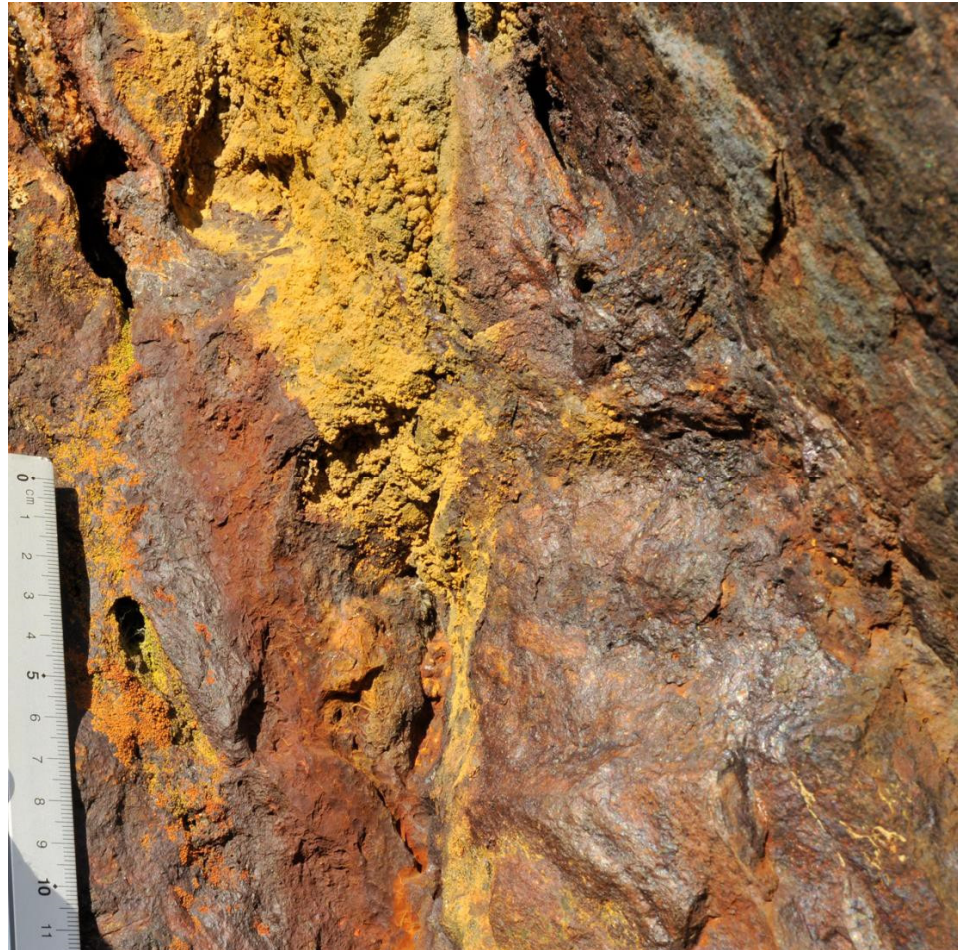












Additional examples of jarosite formations and their weather products in proximity to the holes and cracks in the rock at the Stefføya site. The image to the right is a closer view of one of the holes visible on the rock surface.

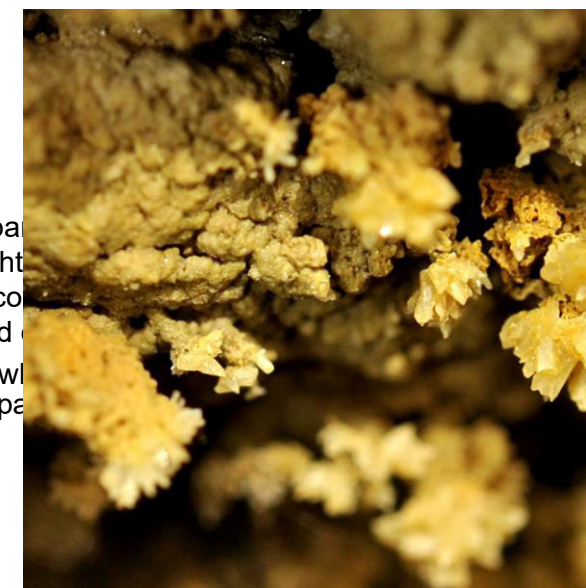


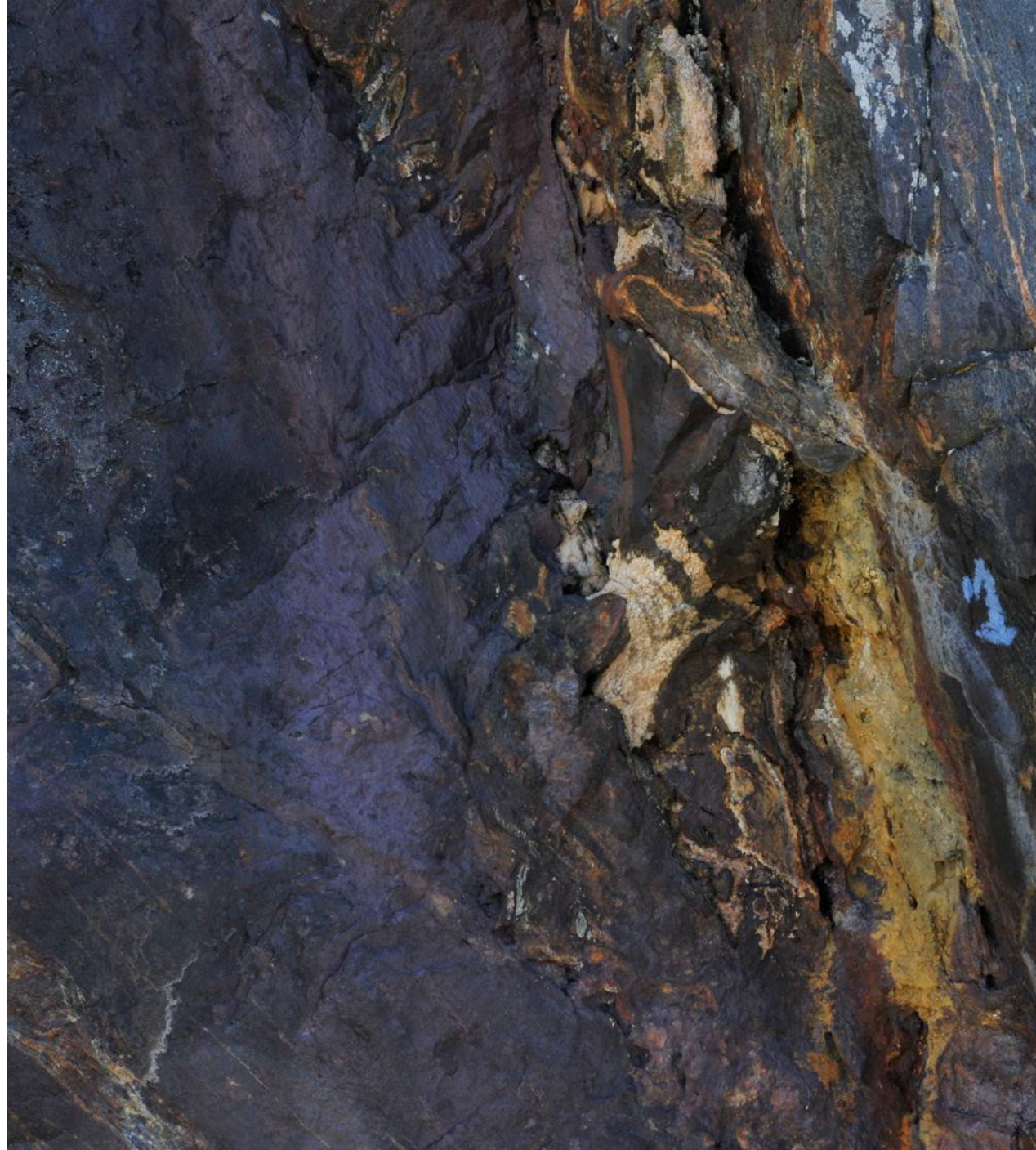


Jarosite formation at Stefføya site. Some tiny gypsum formations on top of the jarosite are noticeable. Probably, some of them, which were dissolved, are re-precipitating to the left side of the jarosite formation at the edge.

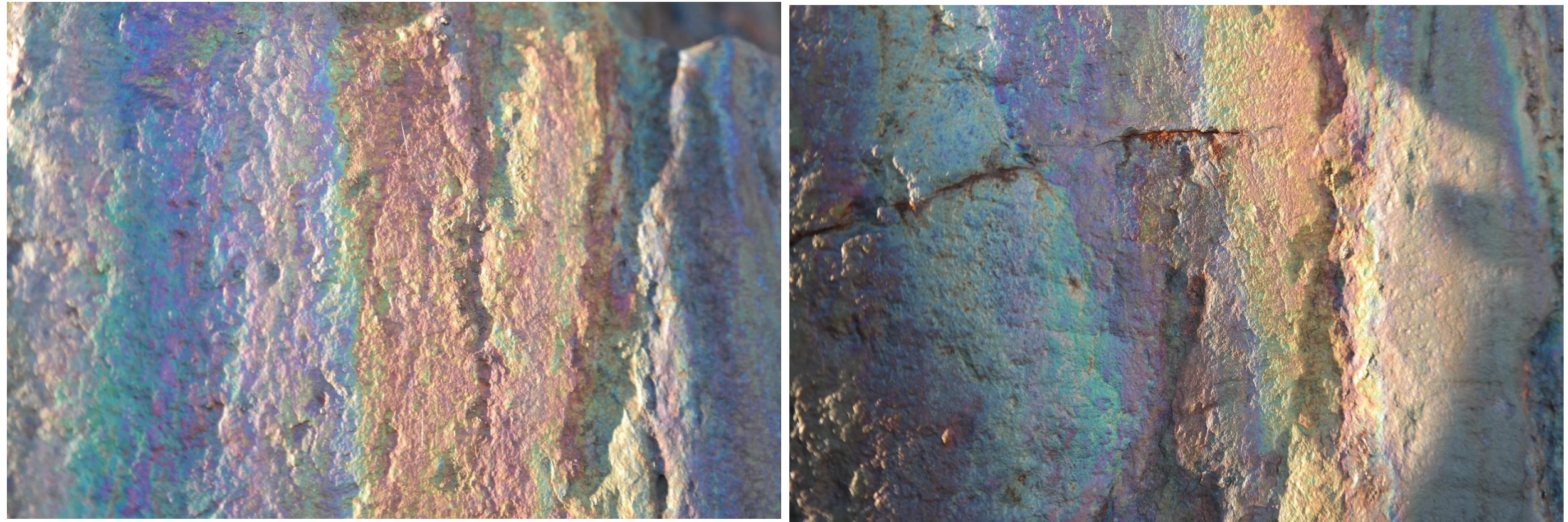


Image of gypsum formation in a sheltered part of the rock at Stefføya site. The images to the right show the gypsum formed on top of the jarosite. There is a connection between the inner part of the hole and the outer part. The gypsum formed in the inner part is to be dissolved compared in the outer part, with exposure to water, compared to the interior part.





The rock varnish with iridescence and shiny appearance close to the sampling site



Some images of the iridescent rock varnish near the jarosite sampling site

Valen site









Cross-sectioned sample

