The use of synchrotron radiation for the characterization of Roman Wall paintings from Bayt Ras tomb

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Bridging Natural Science and Heritage in the Middle East: German Institutions, Archaeology, Artefacts, and SESAME

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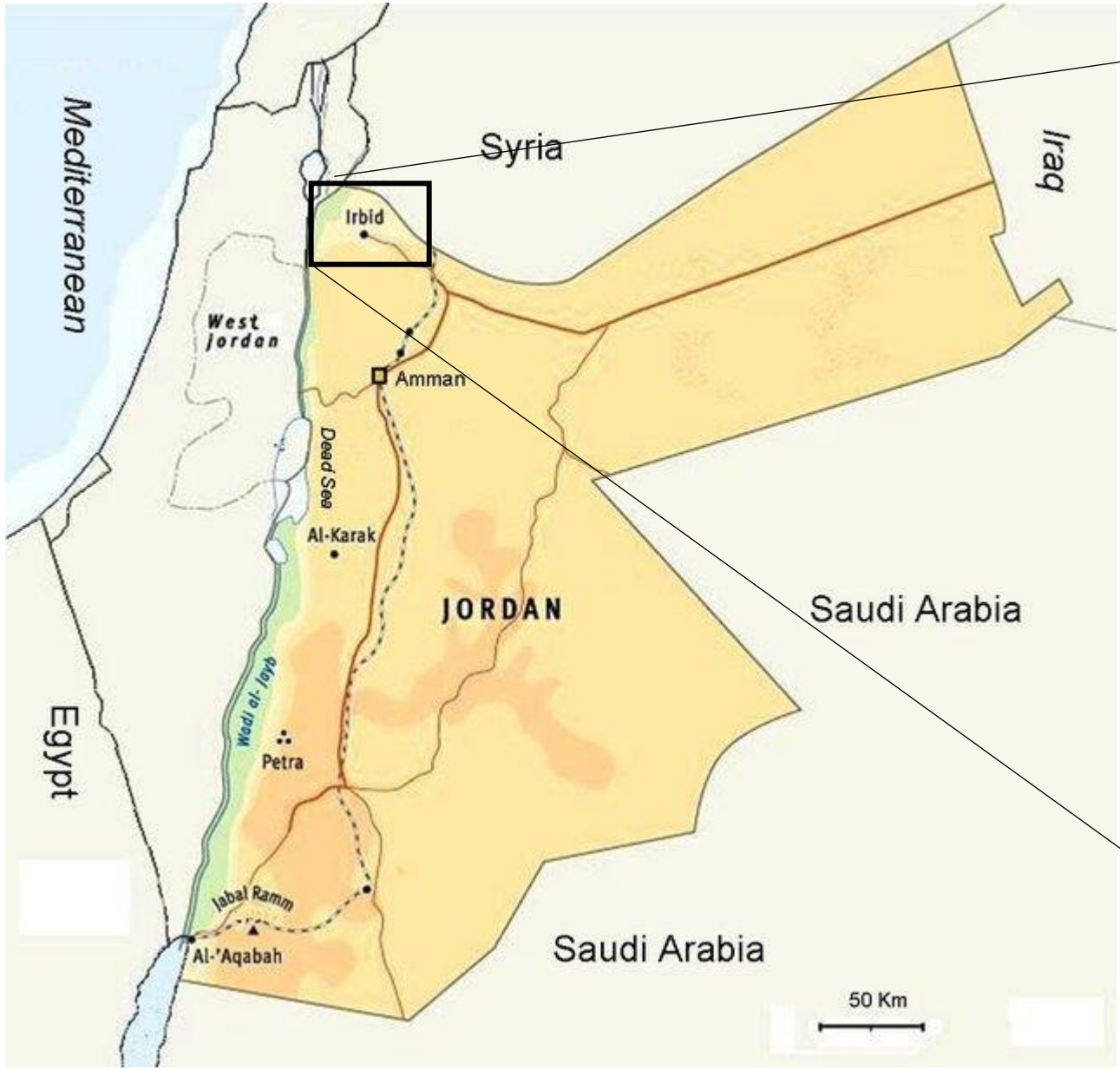
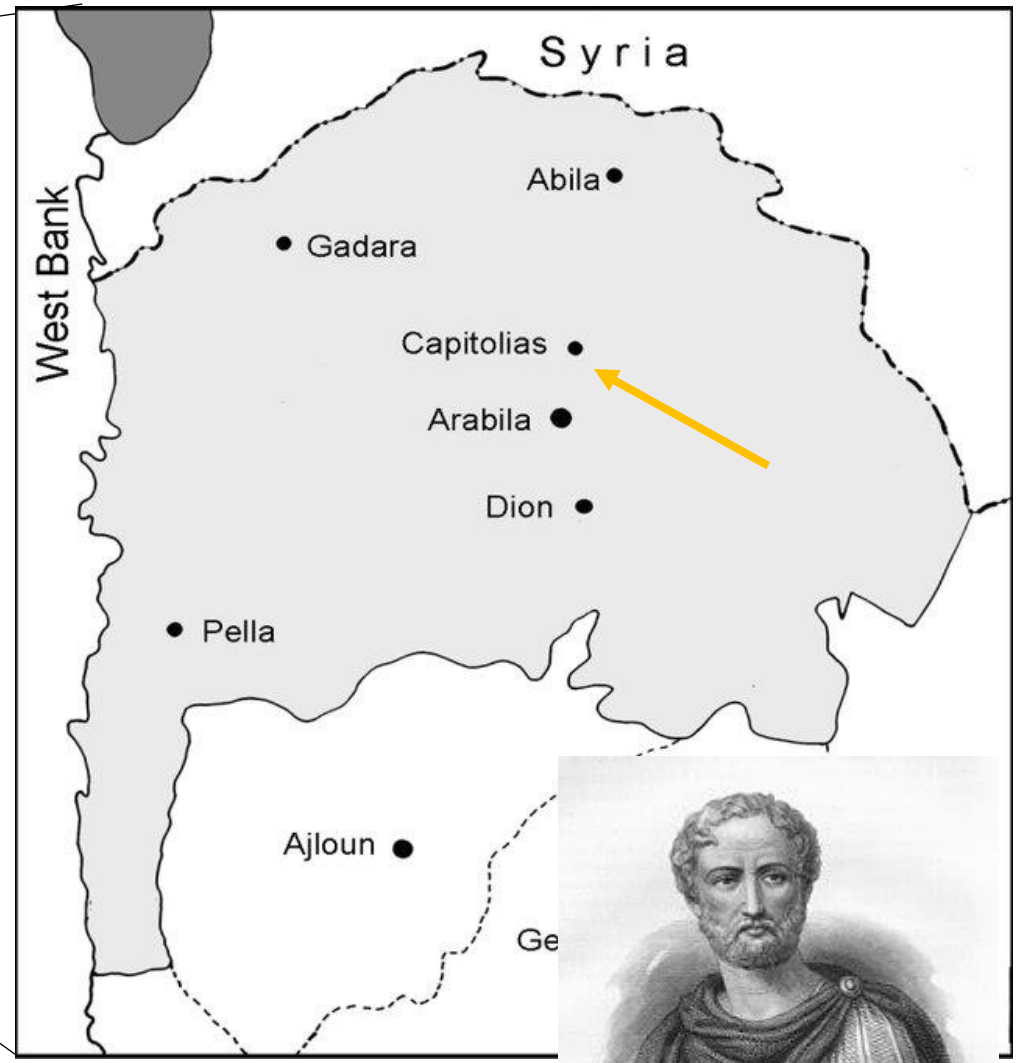
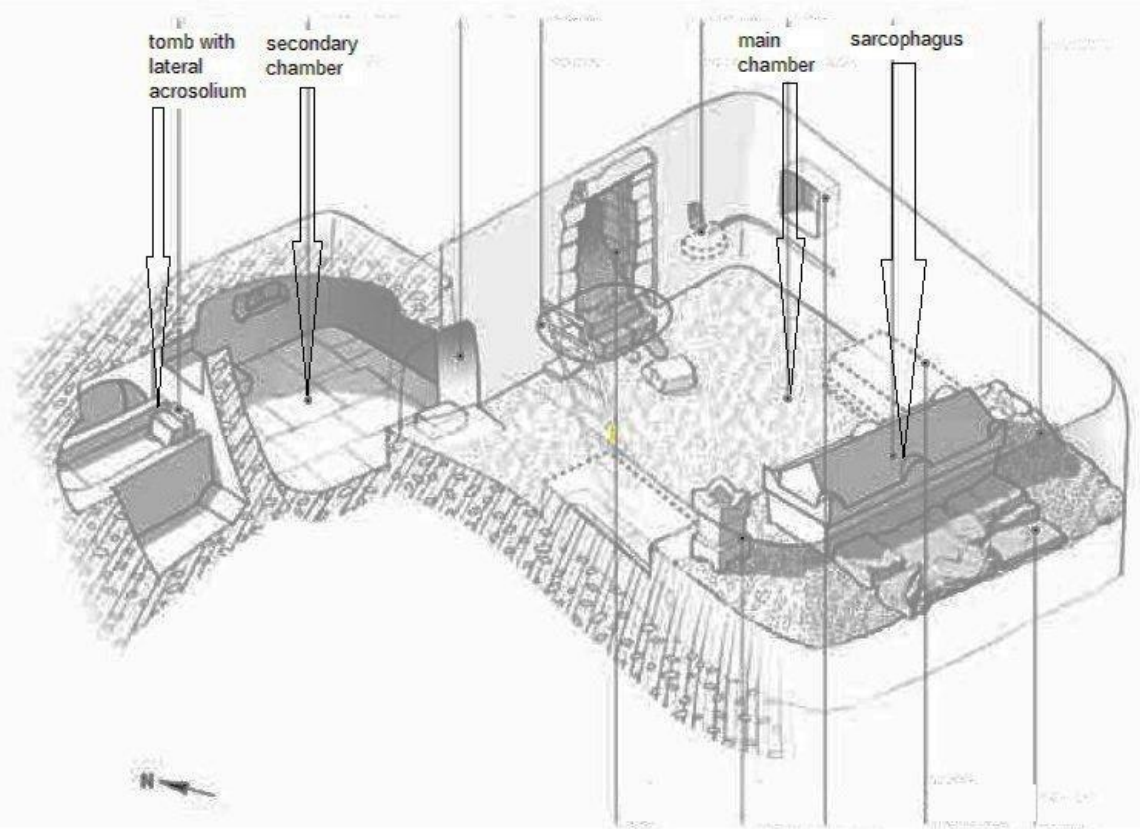

Mediterranean
Syria
Iraq
Irbid
West Jordan
Amman
Dead Sea
Al-Karak
JORDAN
Saudi Arabia
Wadi el- Iayb
Egypt
Petra
Jabal Ramm
Al-'Aqabah
Saudi Arabia
50 Km


Syria
West Bank
Abila
Gadara
Capitolias
Arabila
Dion
Pella
Ajloun
Ge

PLINIO SECONDO



Haron et al. (2019)

NORTH WALL
THE CONSTRUCTION SITE

28. ΟΥΑΙ ΛΕΙ ΜΕΙΘΙΘ.
"Alas for me, I am dead!"

36. ΙΘΑΒΑΡΕΙΧ.
"May he be blessed!"

39. ΑΝΑ ΜΑΛΛΙ.
Maybe: "I am full/done."

43. ΩΒΙΑ.
"Thick, stupid."

Bayt Ras

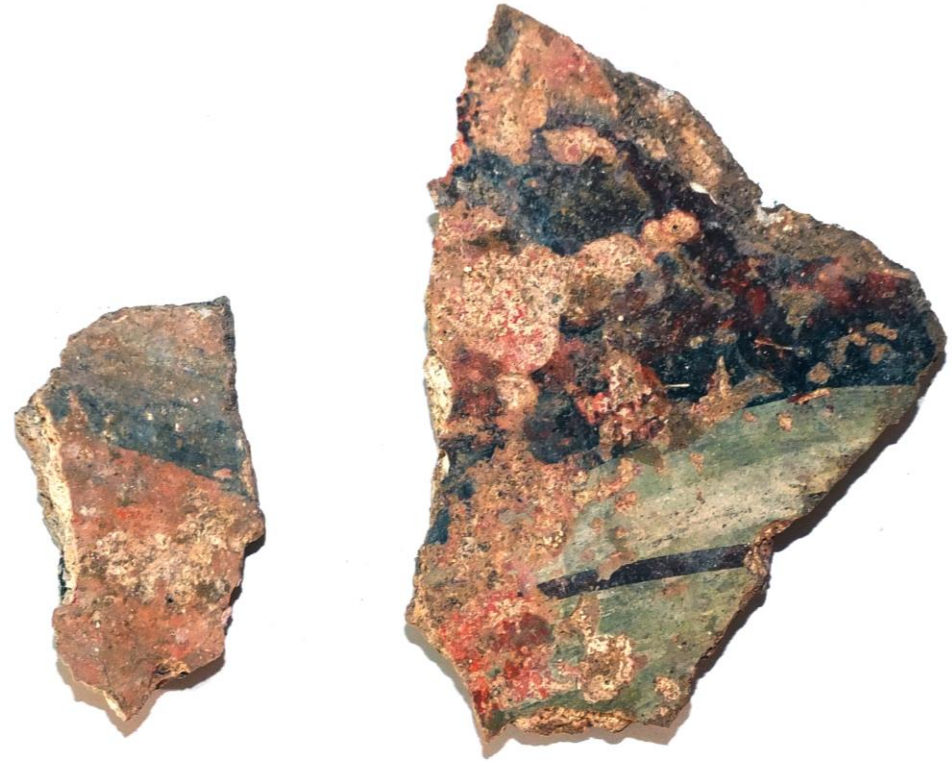
B8

cm

Bayt Ras

K 10,K 11

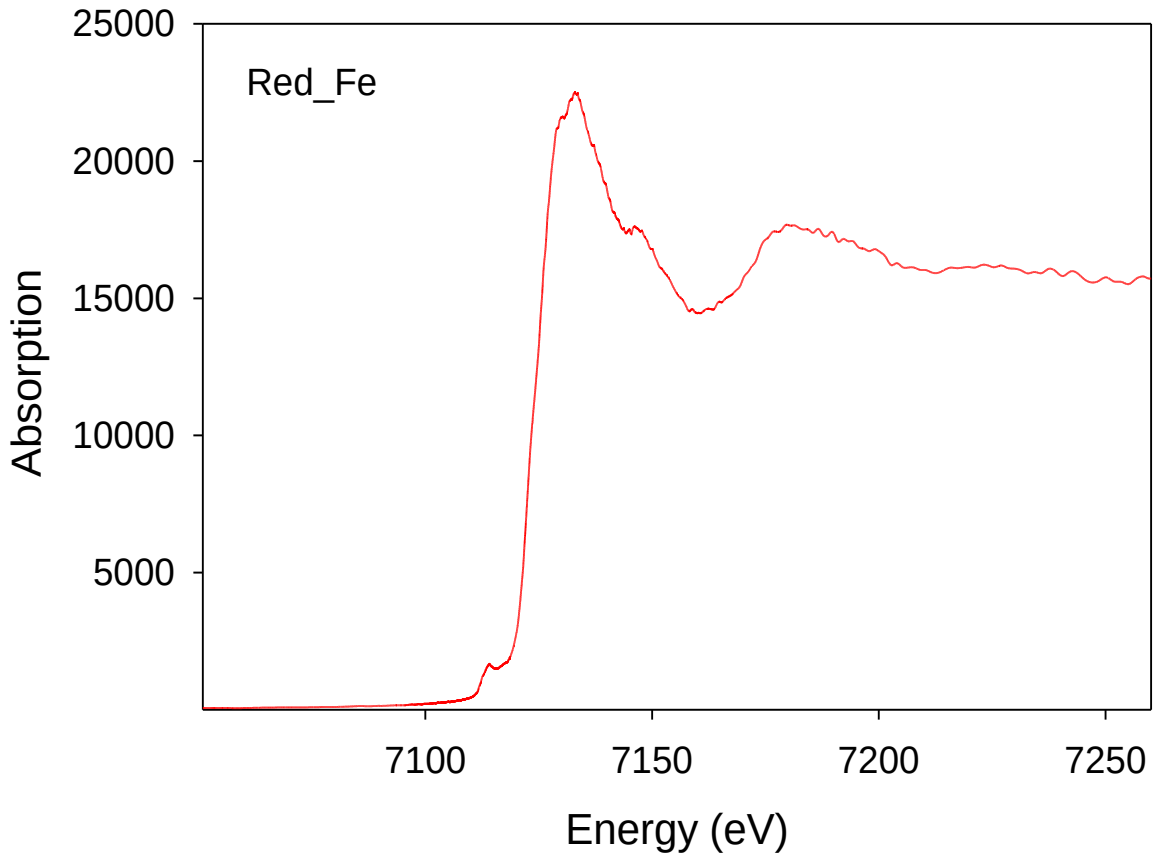
cm

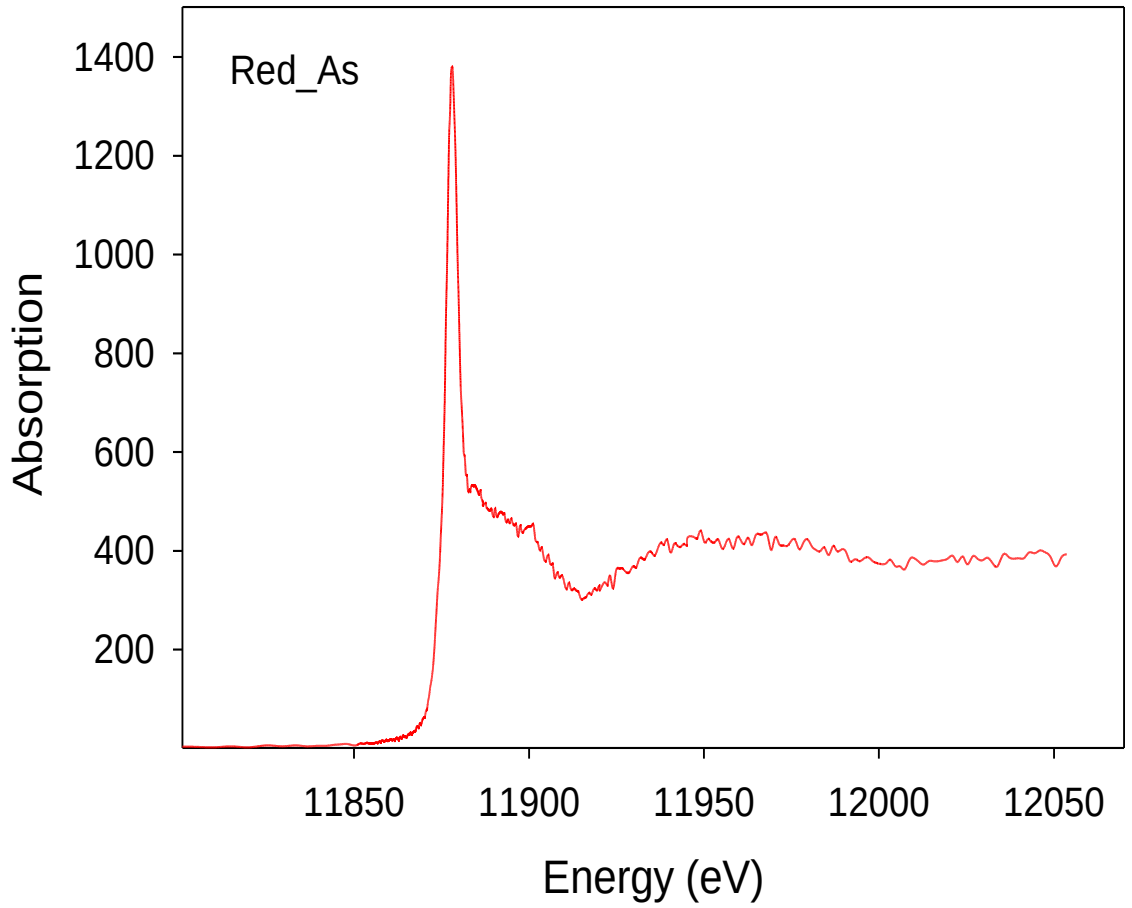


g 9

cm

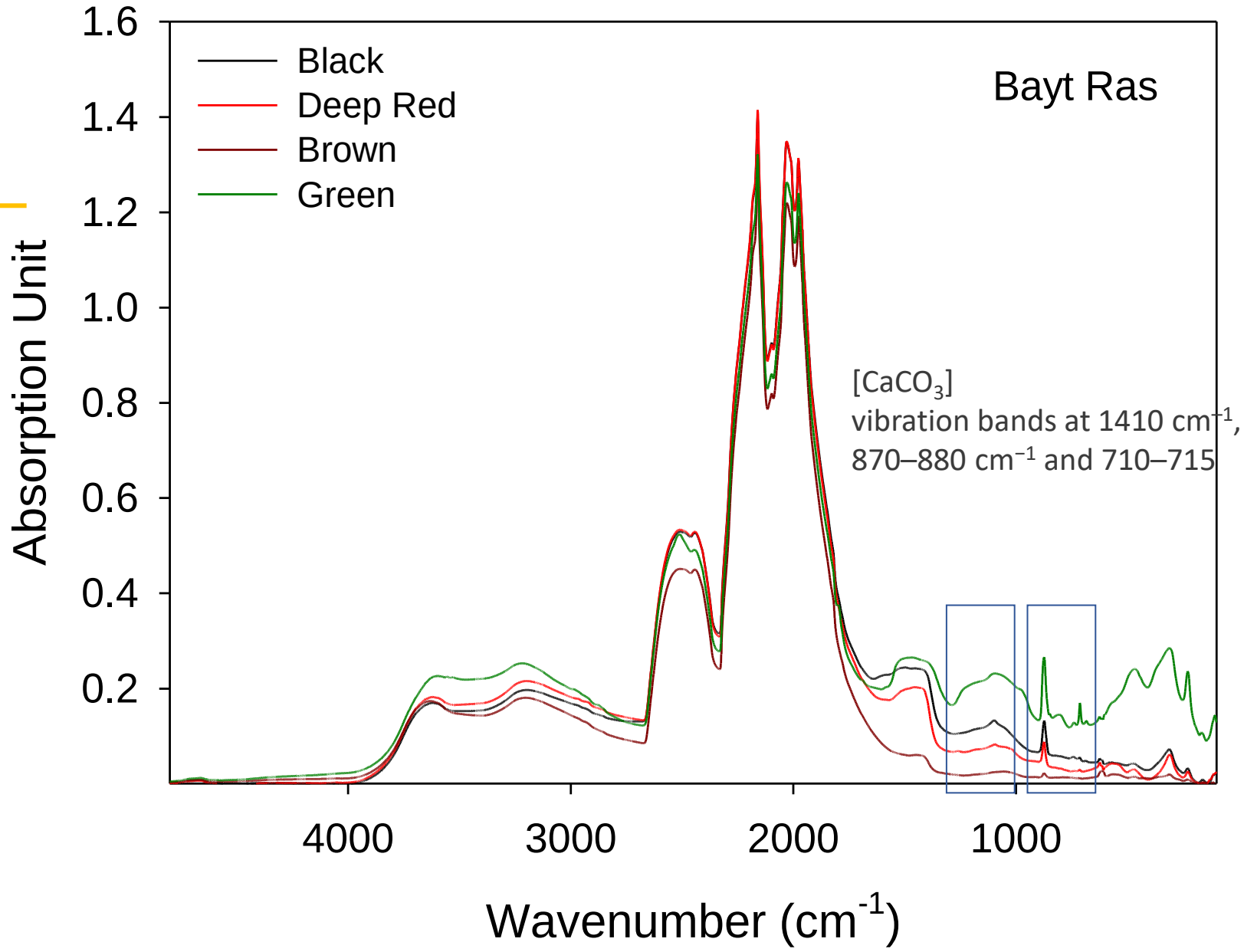
2D scanning XRF and XANES

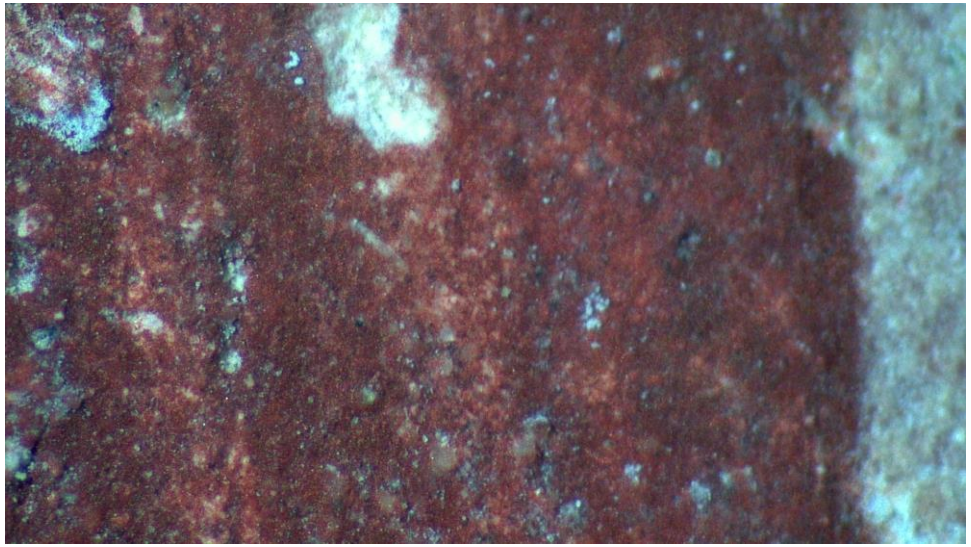


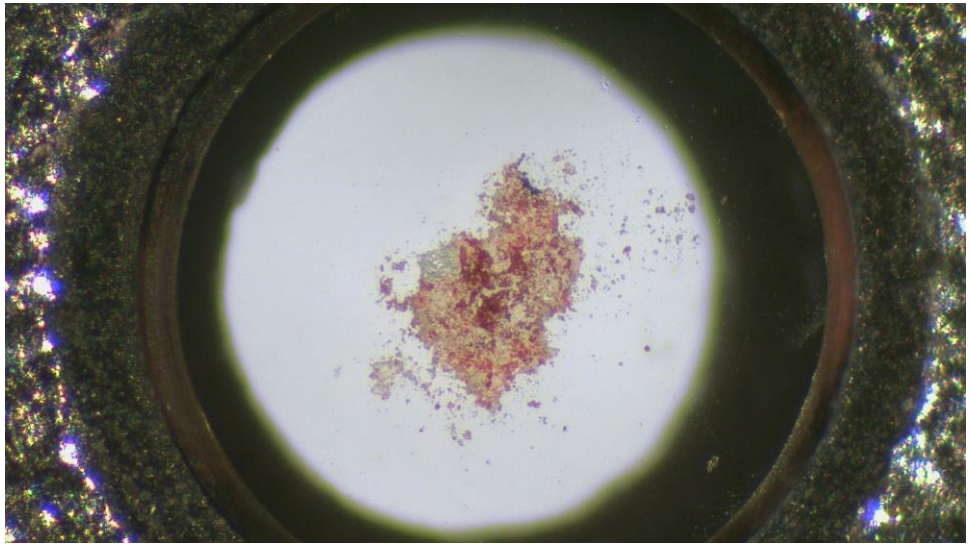


FTIR spectrometer

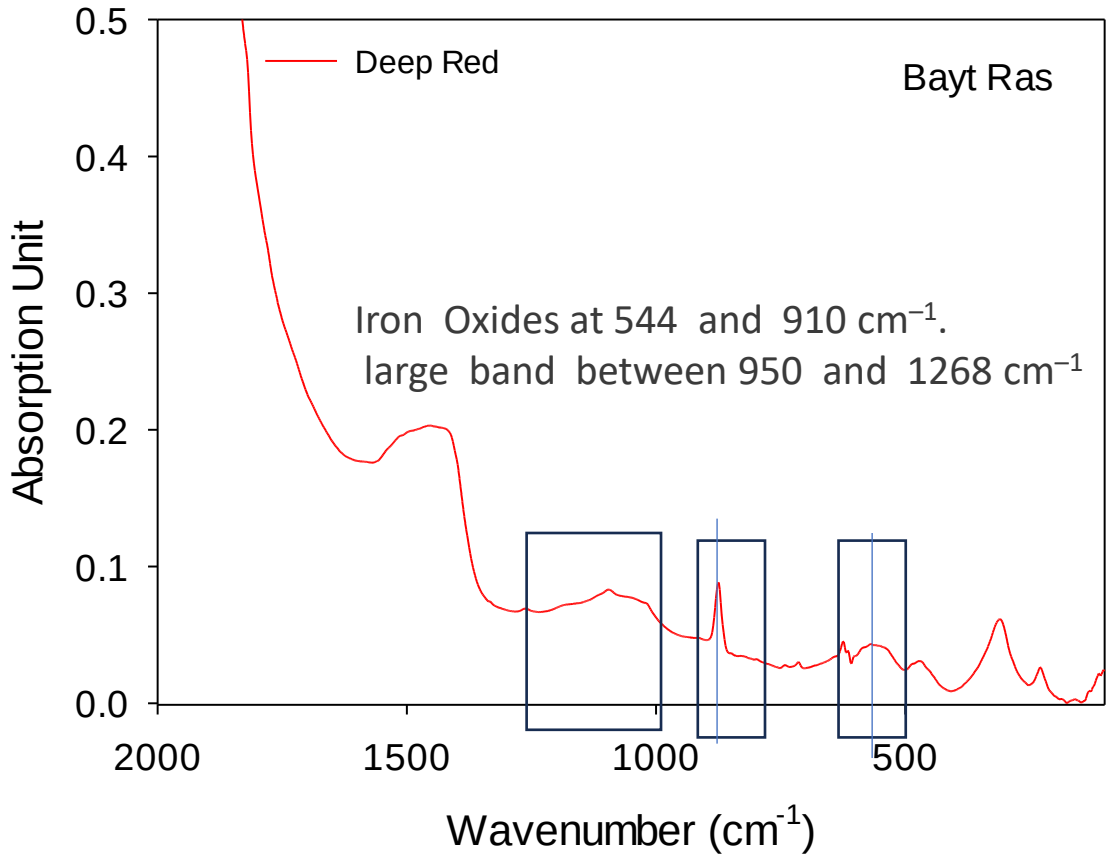
The samples were analyzed using a Bruker VERTEX 70v FTIR spectrometer coupled with the Hyperion 3000 Vis/IR microscope. The analyses were performed at the Chemical and Life Sciences branch of the infrared beamline, SISSI, of the Elettra synchrotron radiation.

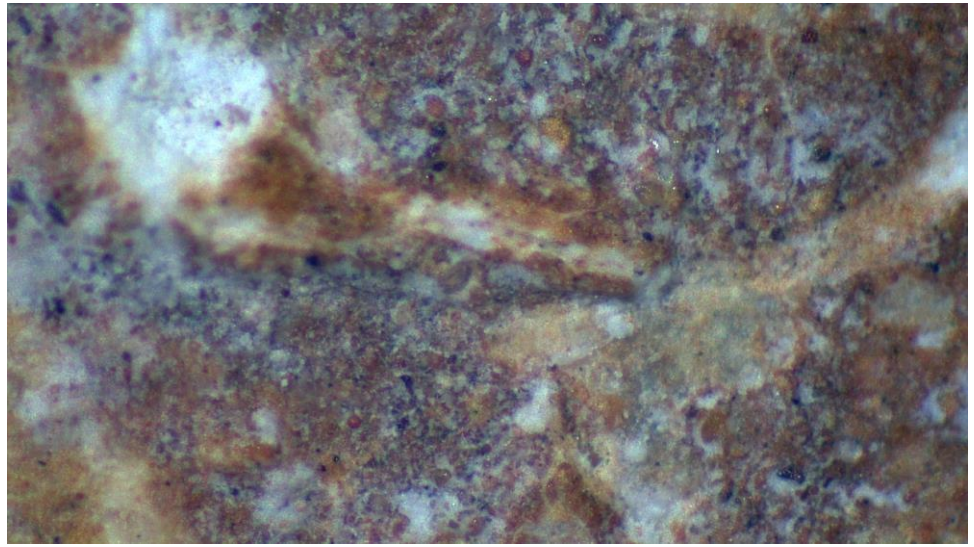


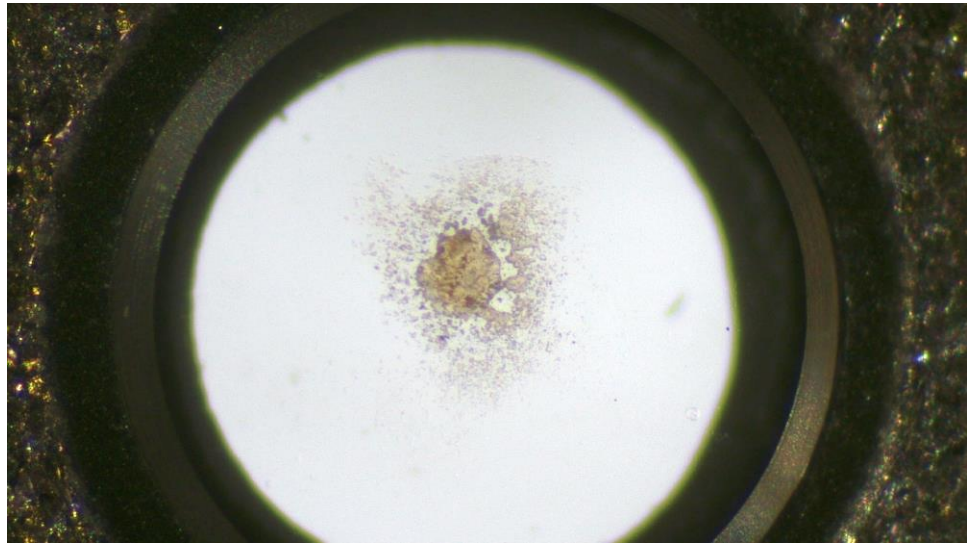




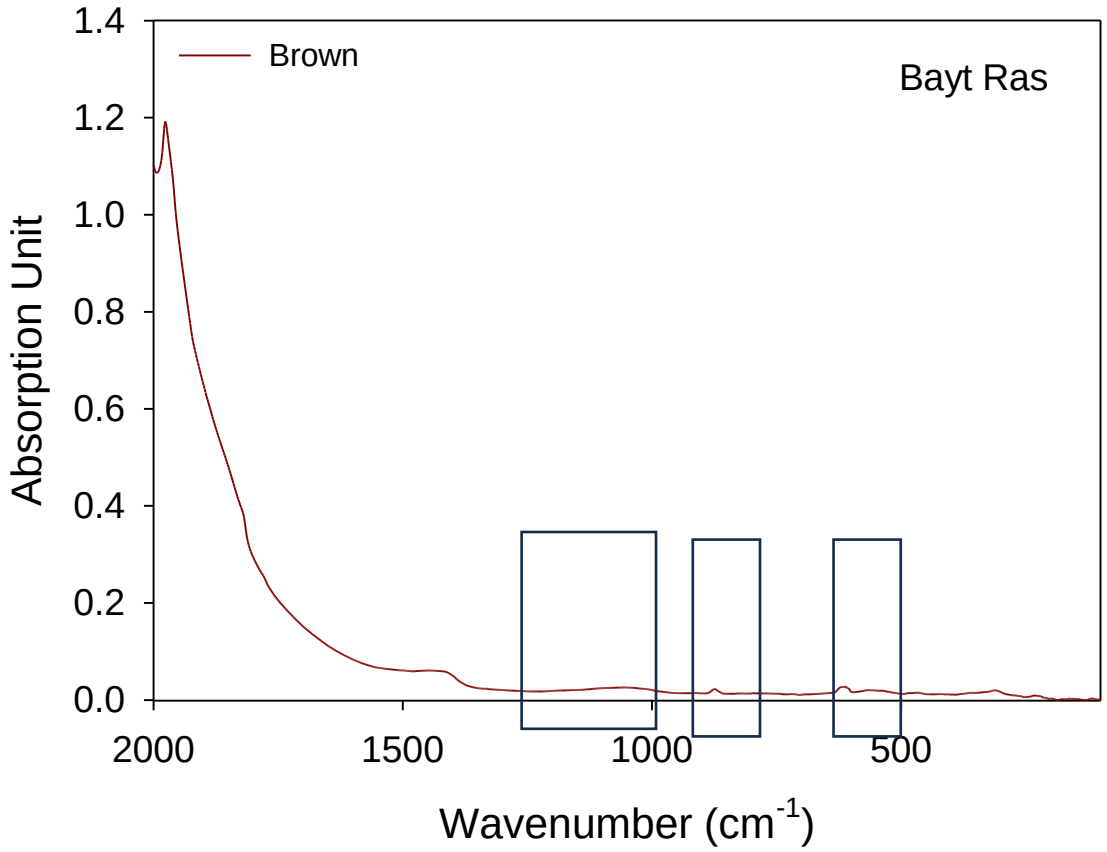
FTIR spectrometer
Red pigment

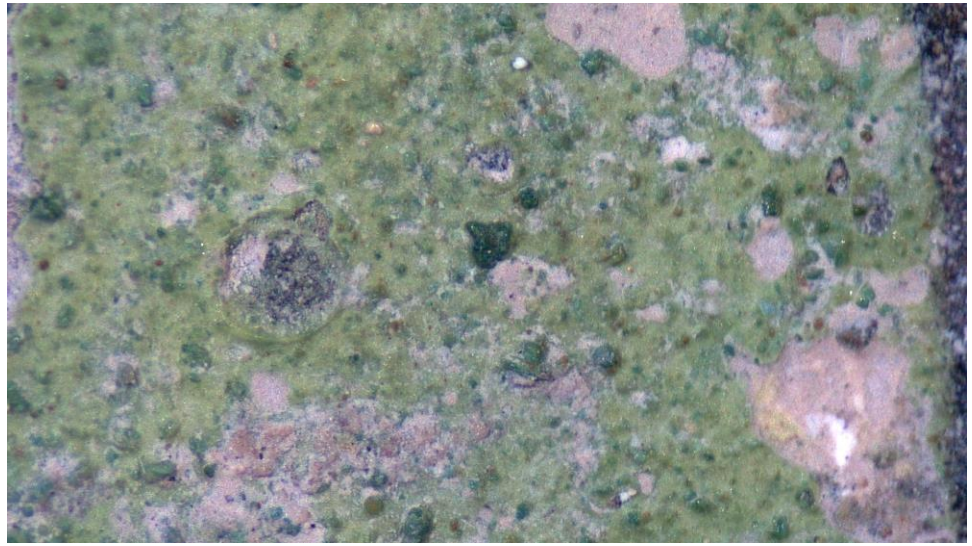


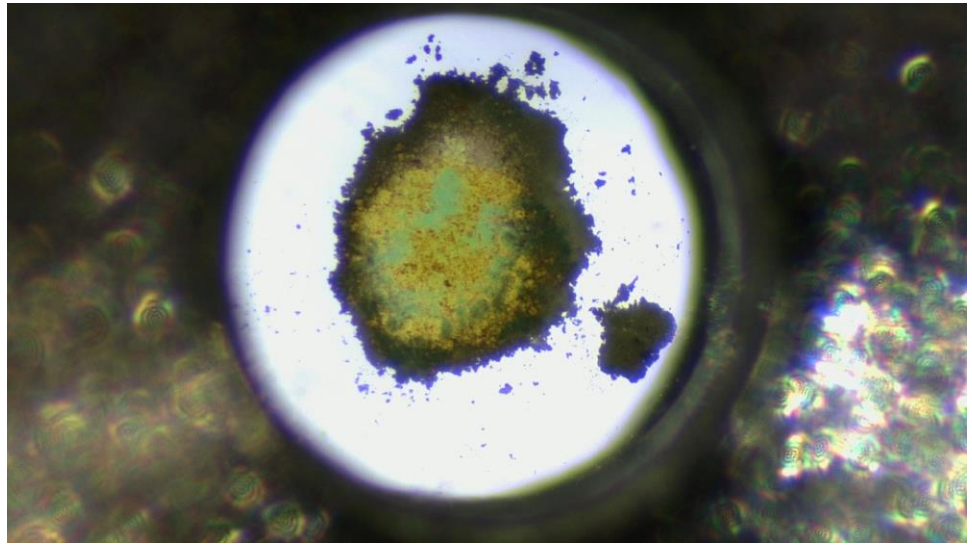




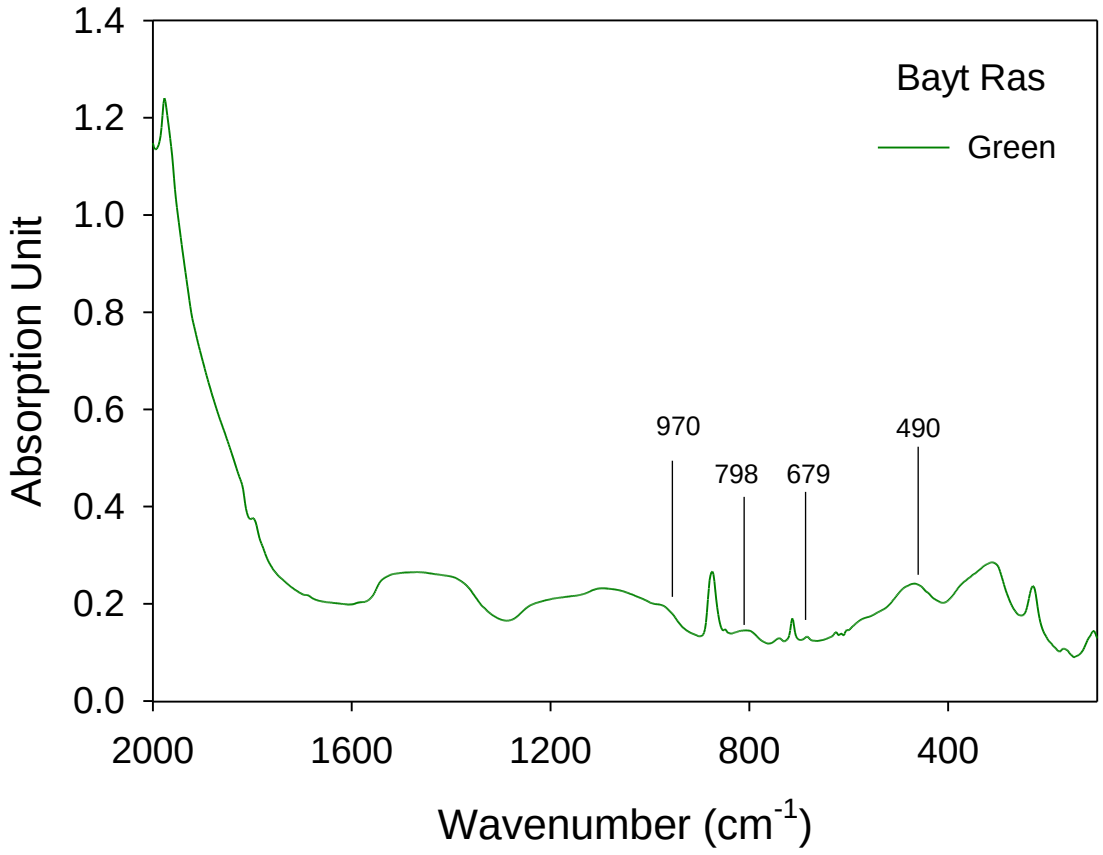
FTIR spectrometer
Brown pigment

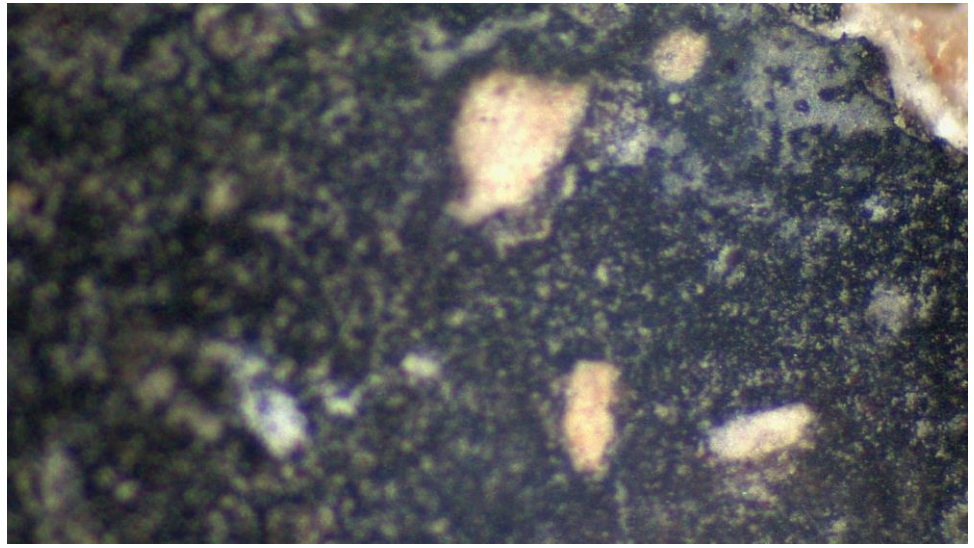


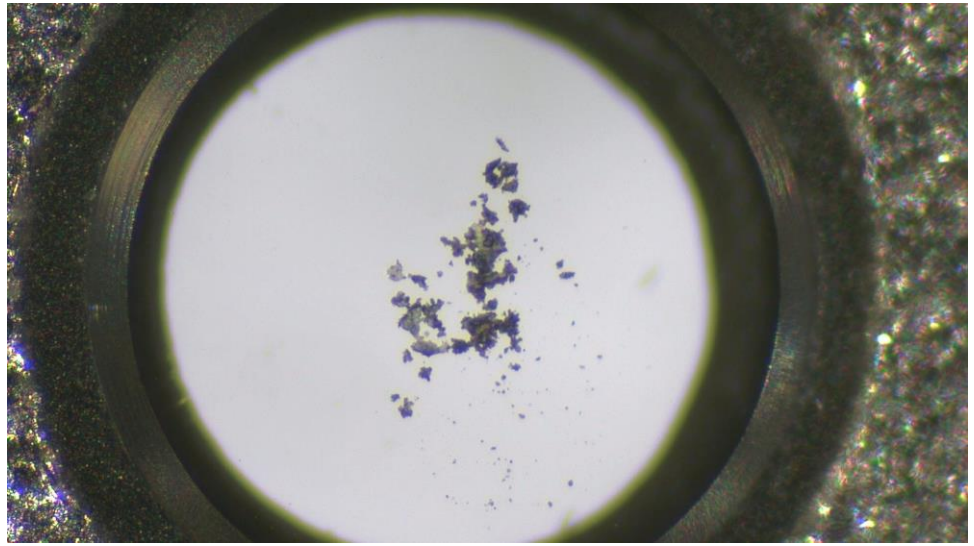




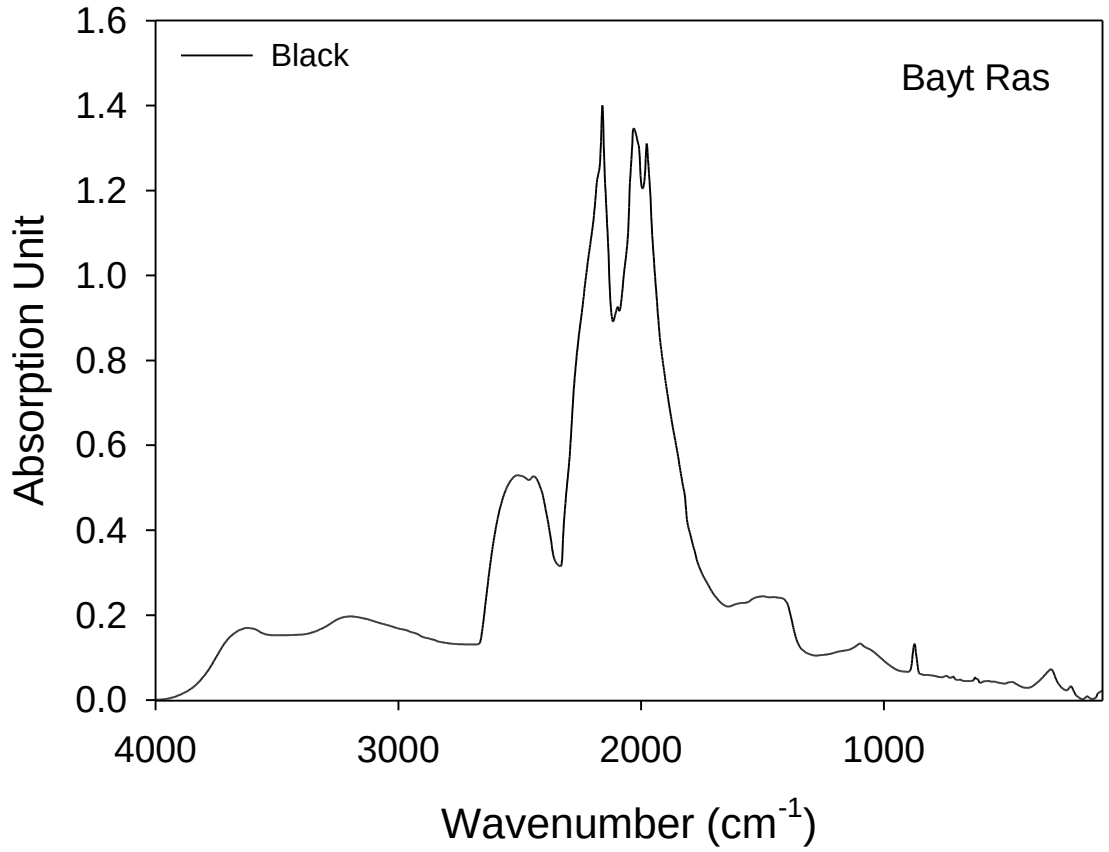
FTIR spectrometer
Green pigment



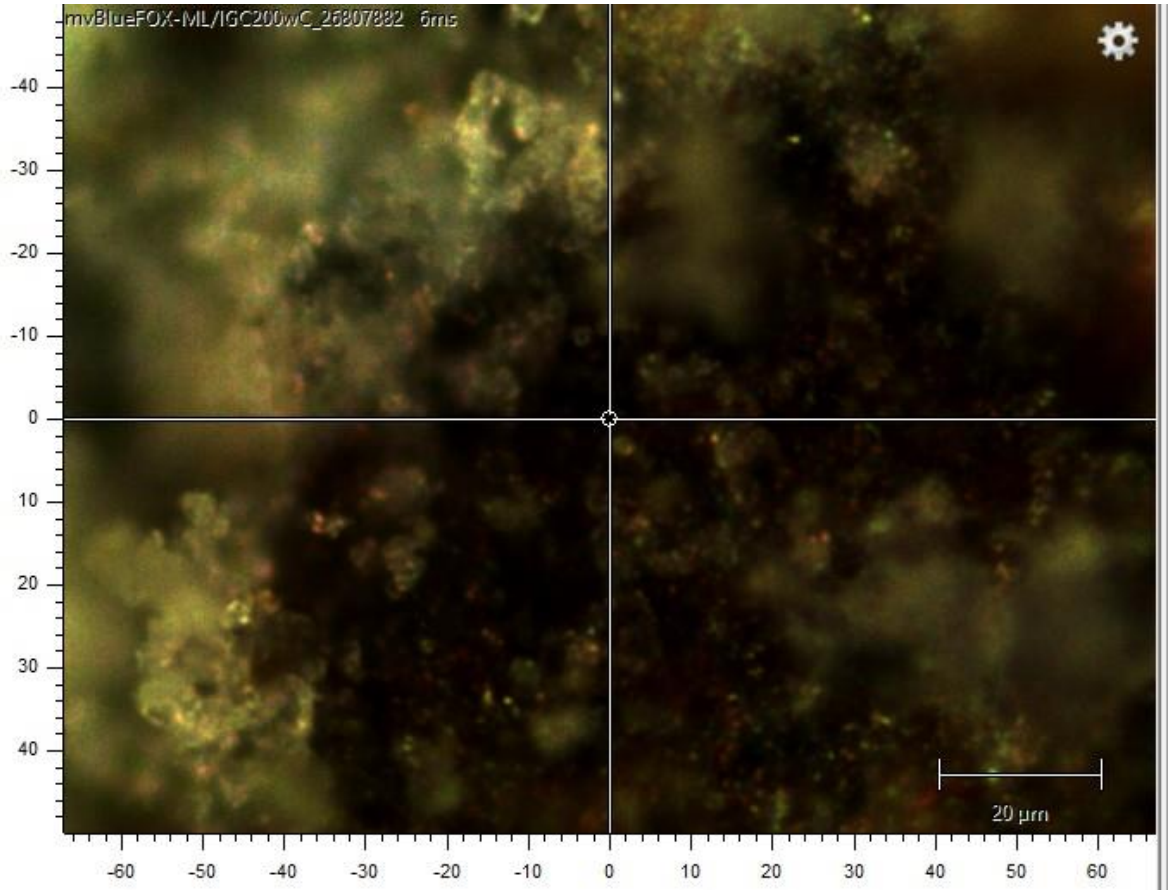


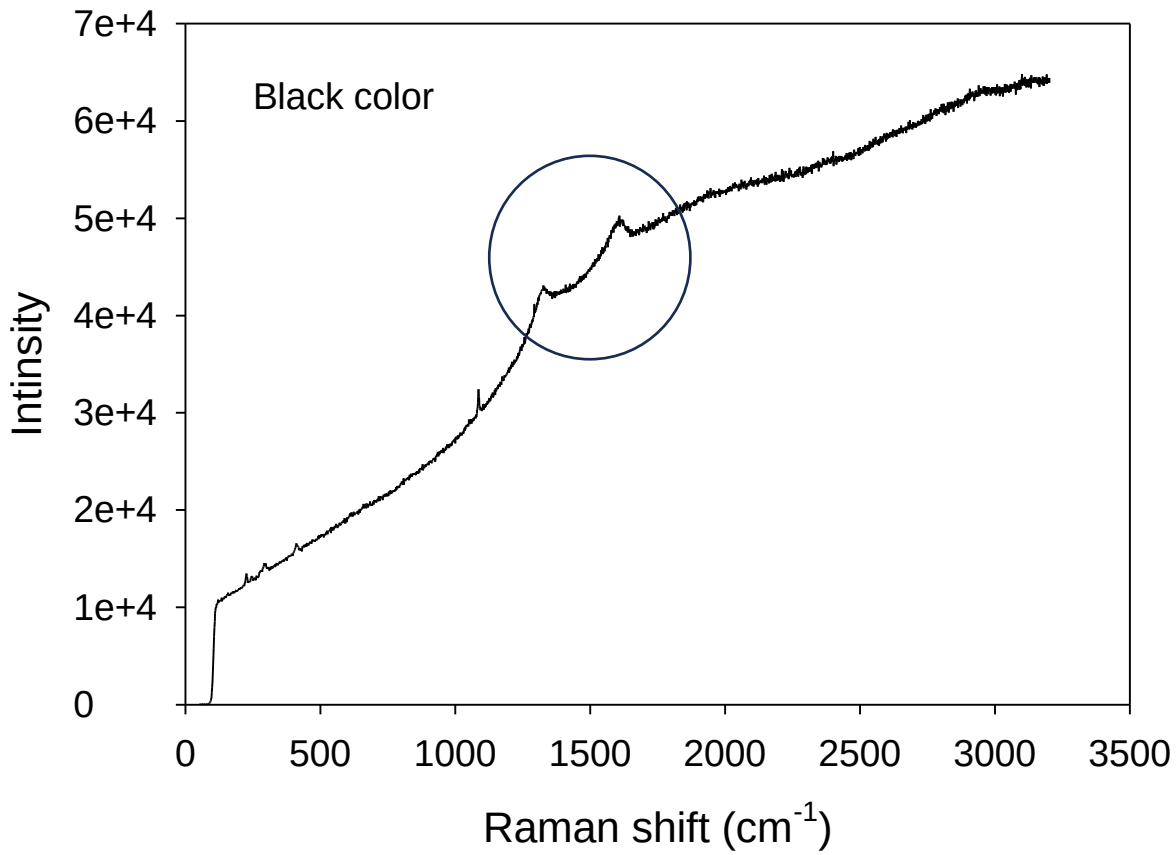


FTIR spectrometer
Black pigment

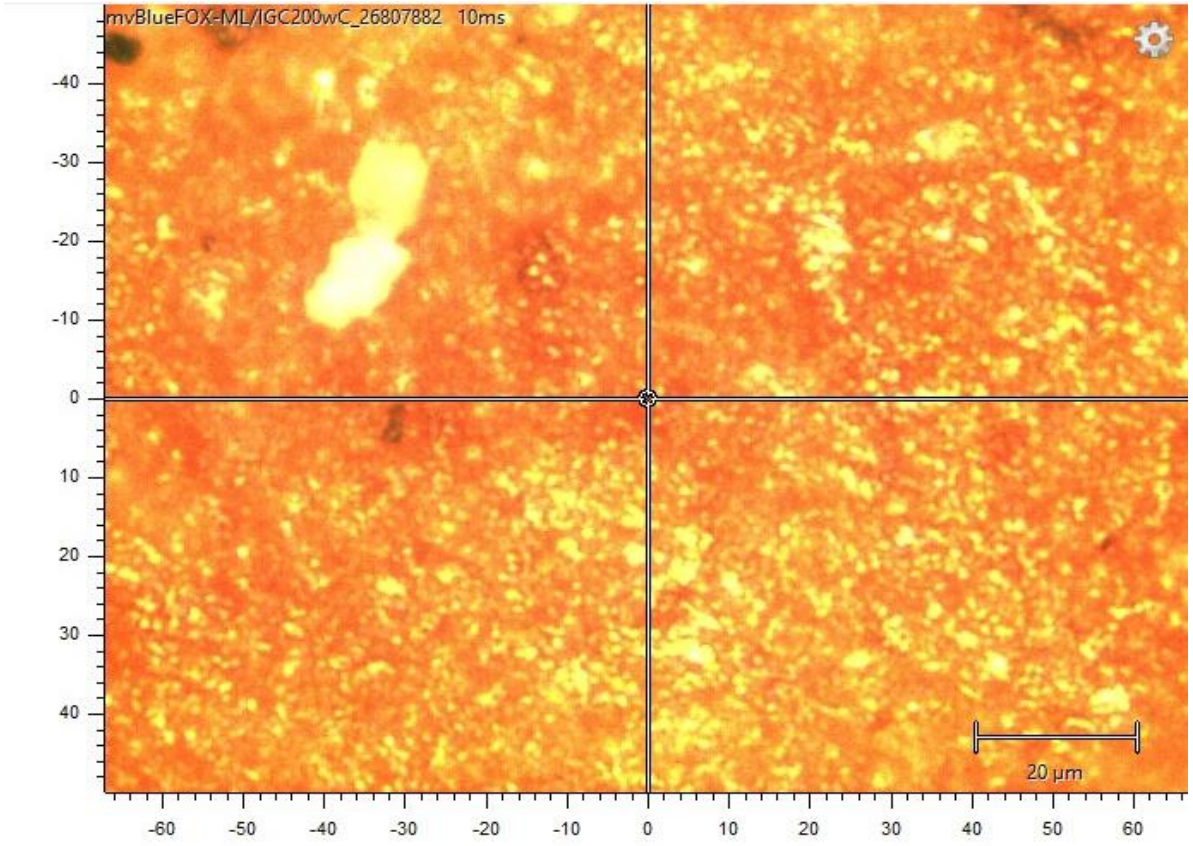


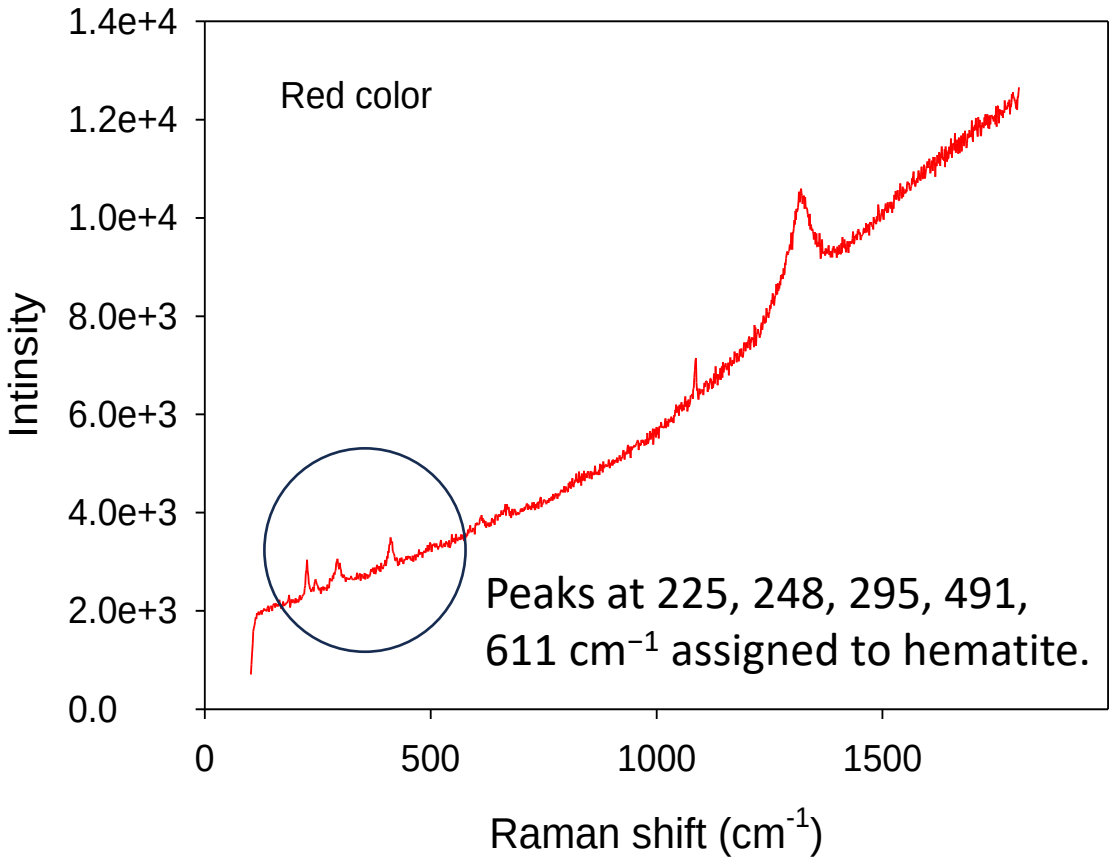
RAMAN Spectroscopy
Black pigment



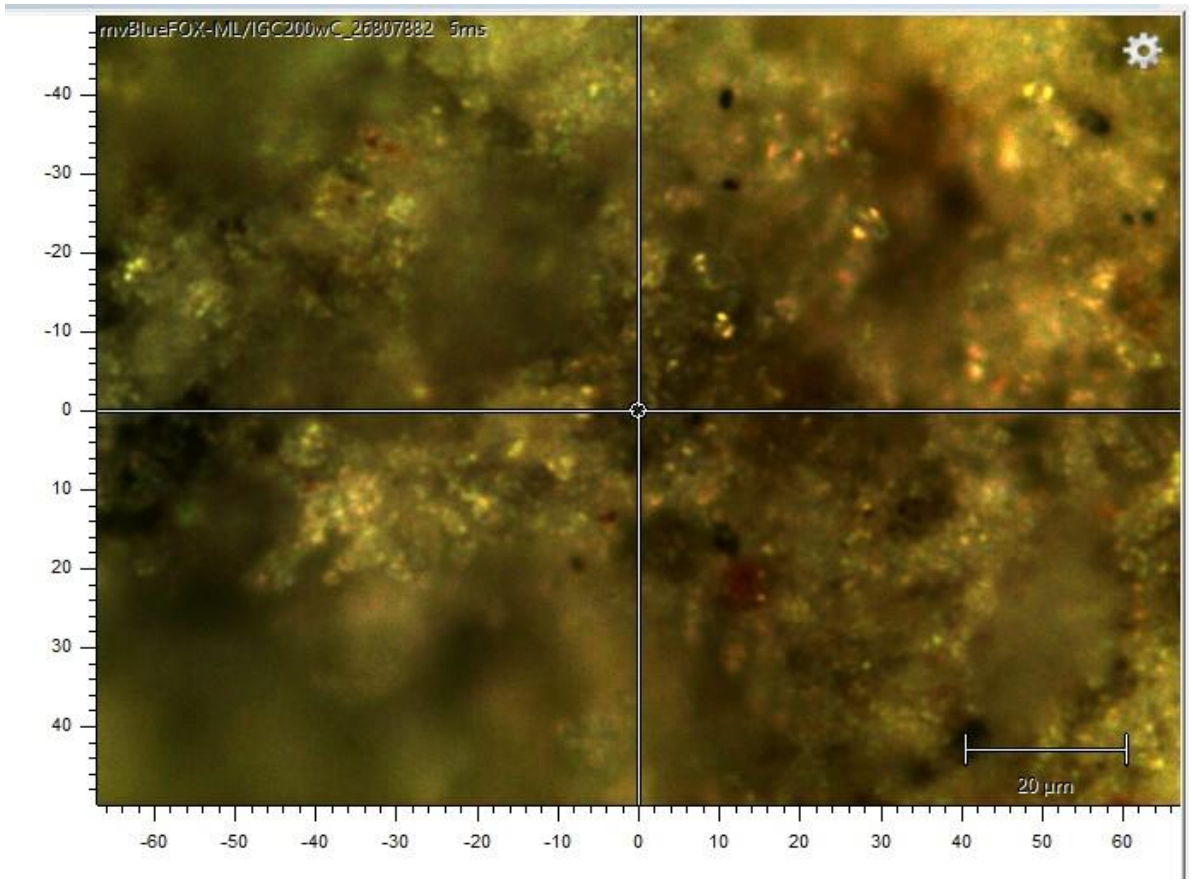


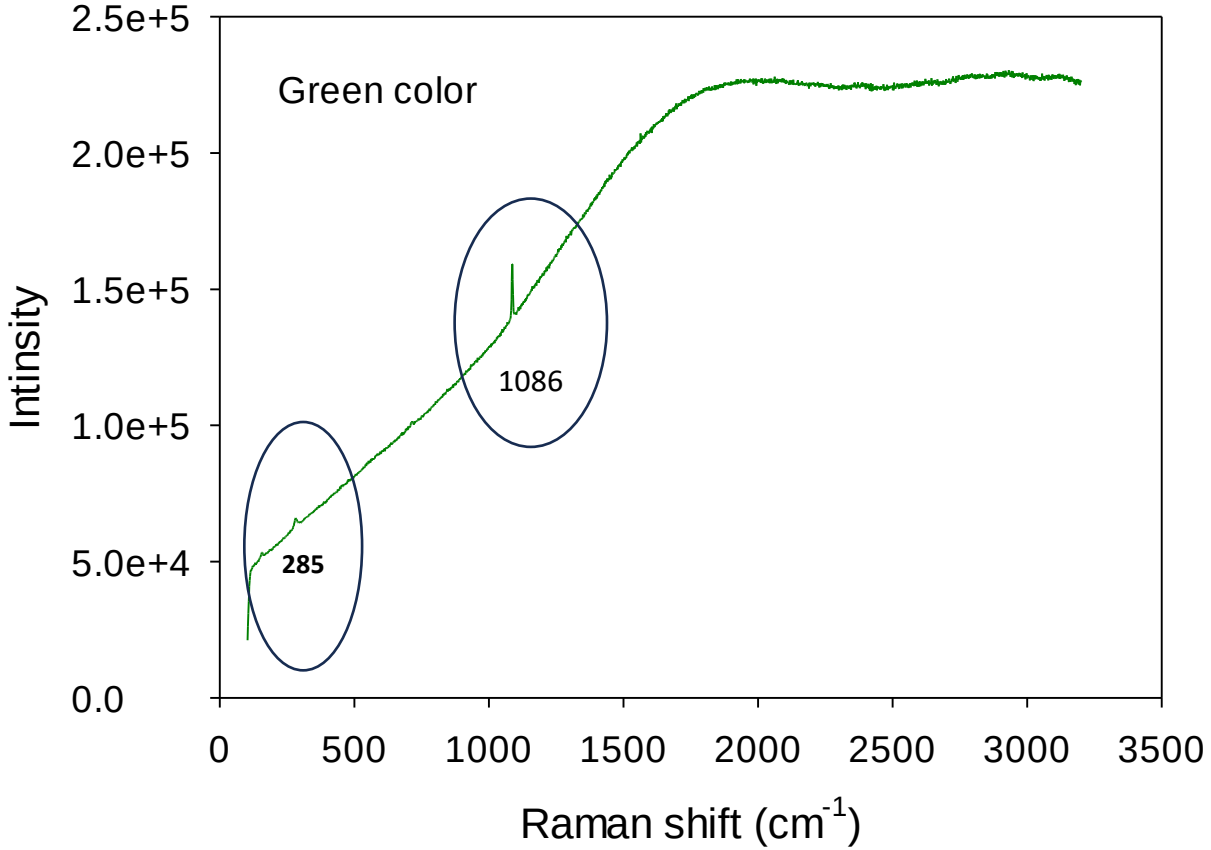
RAMAN Spectroscopy
Red pigment





RAMAN Spectroscopy
Green pigment





Conclusions

- Red and brown pigments were mainly composed from Iron oxides as revealed by the multi analytical methods.
- Red Ochre is the main source of the red pigment which consist of Iron oxides (Fe_2O_3 Hematite)
- The presence of As oxides as seen from XANES, probably intentionally mixed with the ochre to intensify the red color.
- Black color is carbon can easily detected by RAMAN Spectroscopy.
- Green pigment is a complicated case. Most likely, the pigment is “green earth” (Al_2O_3 and Fe_2O_3 contents) as it is the most common green pigments that is used in the Roman Empire.