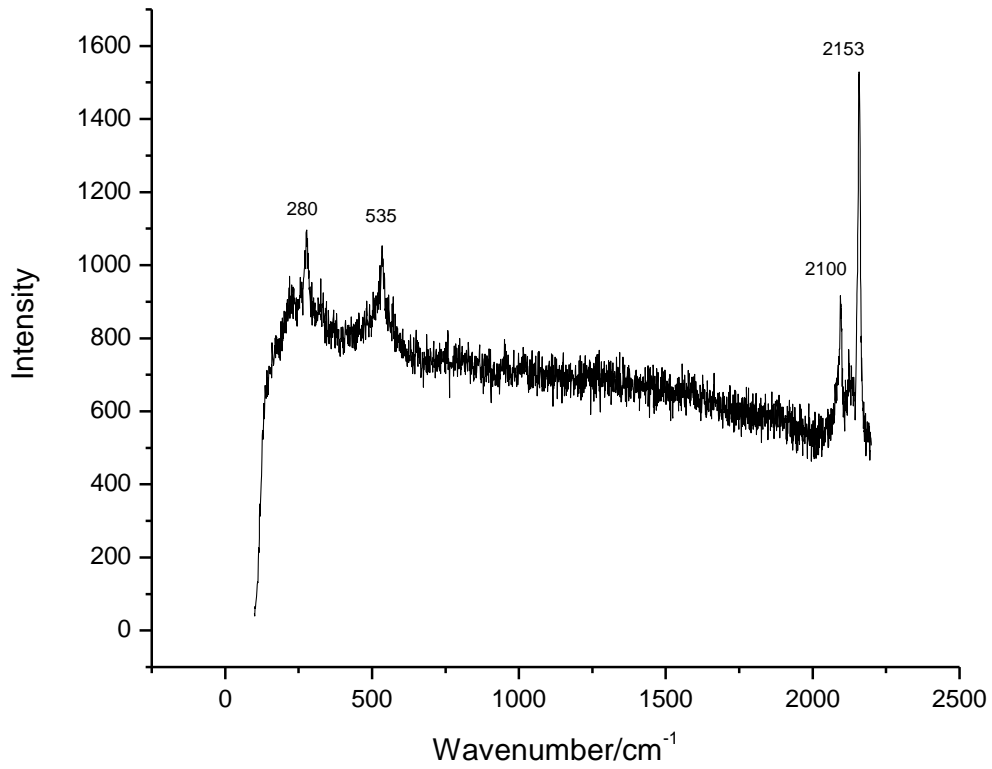


Appendix 3:

Paint composition: Diagnostic Raman scan for each identified paint layer (BI-P1) from selected sample cross sections.

(A single Raman scan is presented for each identified paint layer from an identified sample)

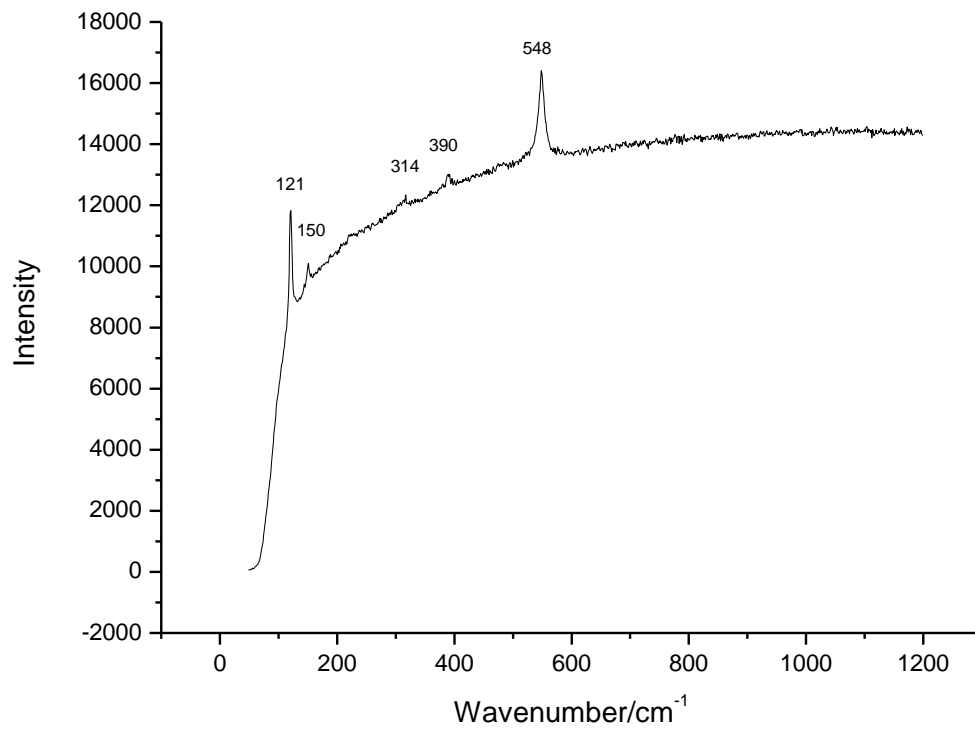
BI – blue layer (original blue ?)



sample B2, blue layer (BI), 3 scans, 1% power, pigment identified: prussian blue

BI - First blue: prussian blue (Bell *et al.* 1997: 2171)

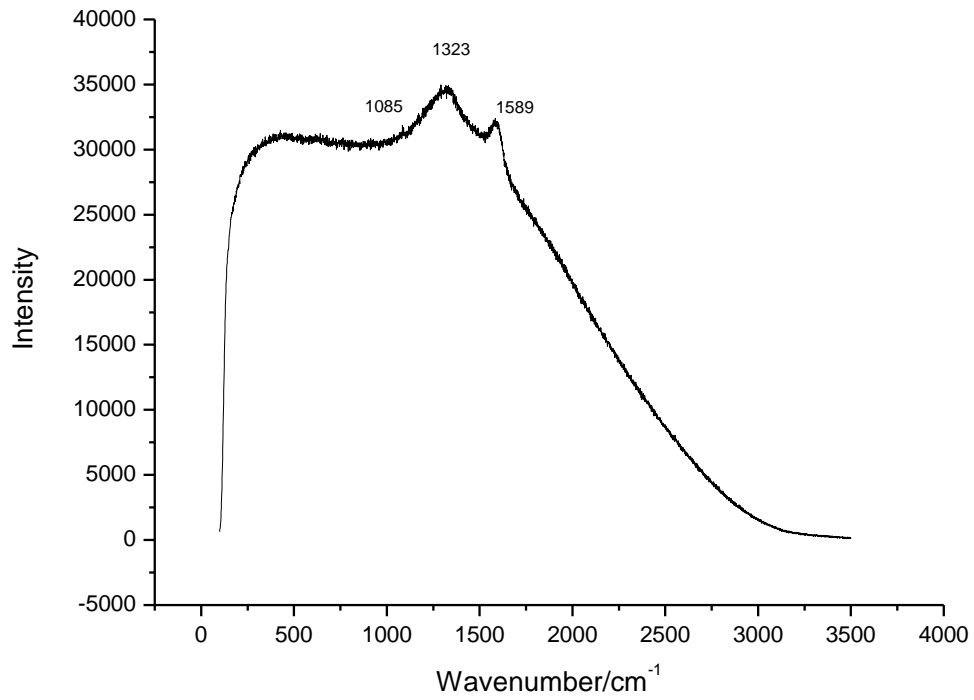
O₁ – orange layer, UV fluorescence bright orange (original orange?)



sample 15, orange layer (O₁), 1scan, 5% power, pigment identified: red lead

O₁ - First orange: red lead (Bell *et al.* 1997: 2174)

P - black layer (original?)



sample 2a, black layer (P), 1scan,5% power, pigments identified: carbon black, calcite

P – Black layer: carbon black, calcite (Bell *et al.* 1997: 2170, 2175)

Volcanic mud layer

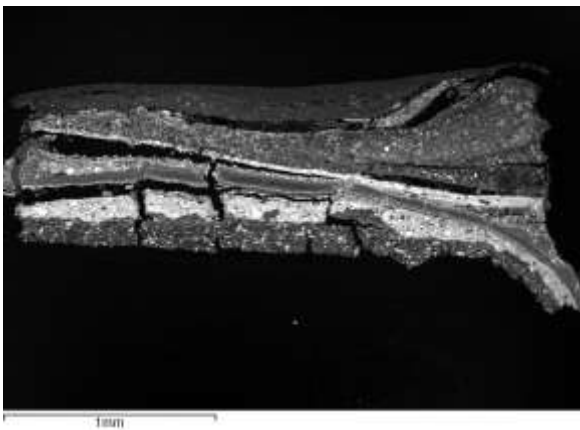
Sample 2, OM image ordinary light



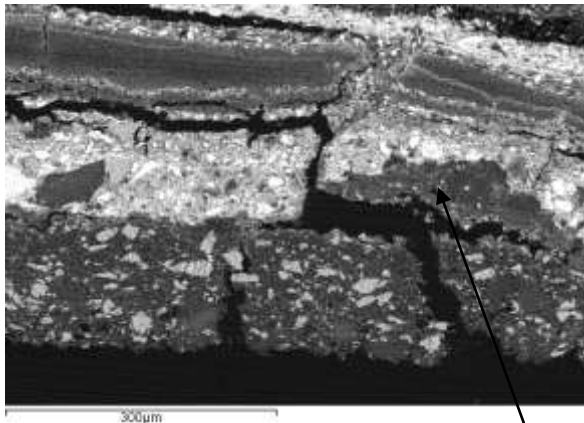
OM image UV light



Sample 2, BSE image

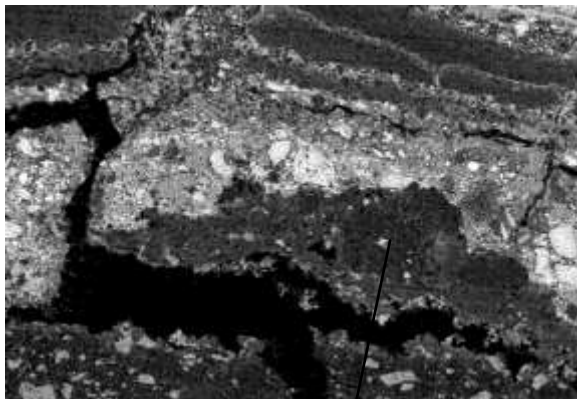


Detail of sample 2 showing volcanic mud layer (layer between P and O₂)

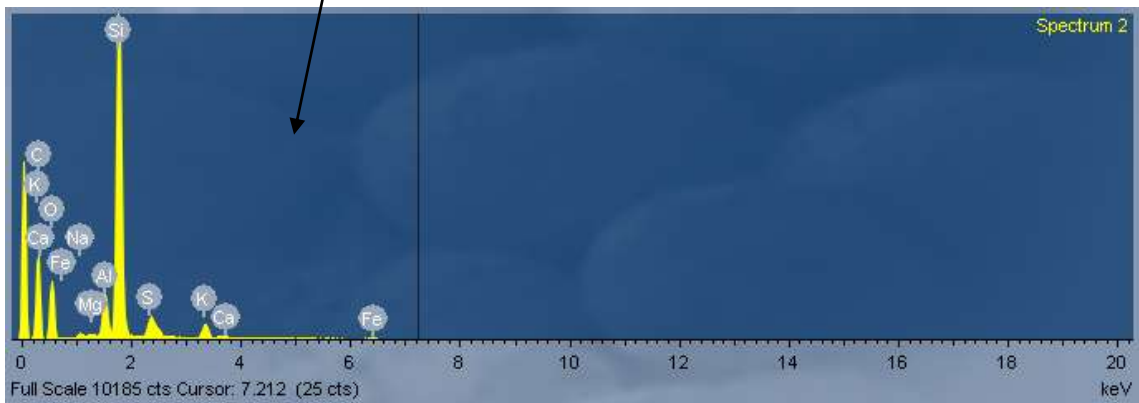


volcanic mud layer

Detail of volcanic mud layer composed of silica

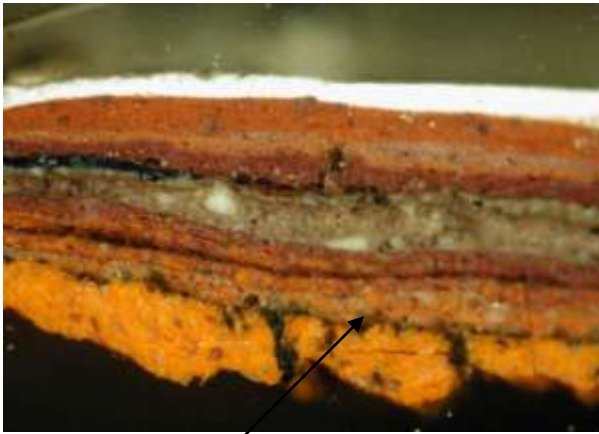


SEM-EDX analysis of volcanic mud layer



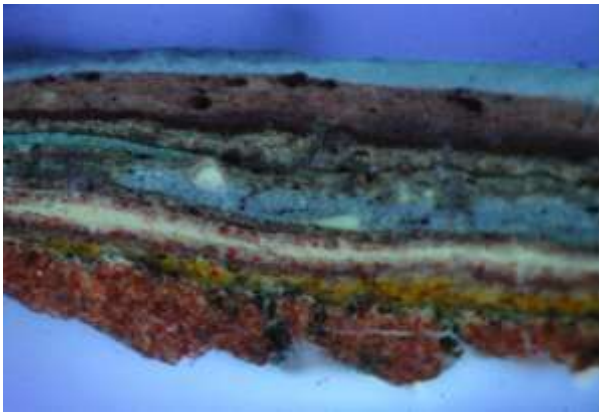
main element silicon

Sample T, OM image ordinary light

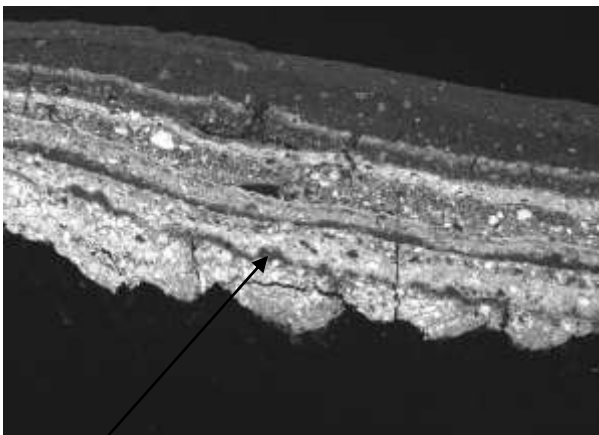


Layer primarily composed of silica probably resultant from the volcanic eruption

OM image UV light

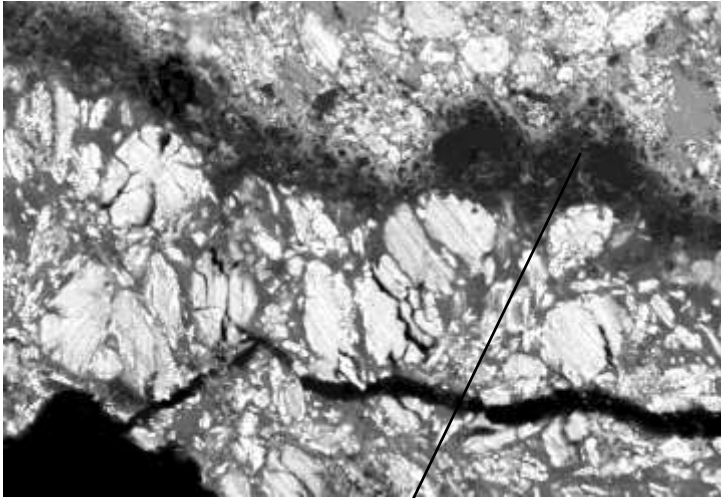


Sample T, BSE image

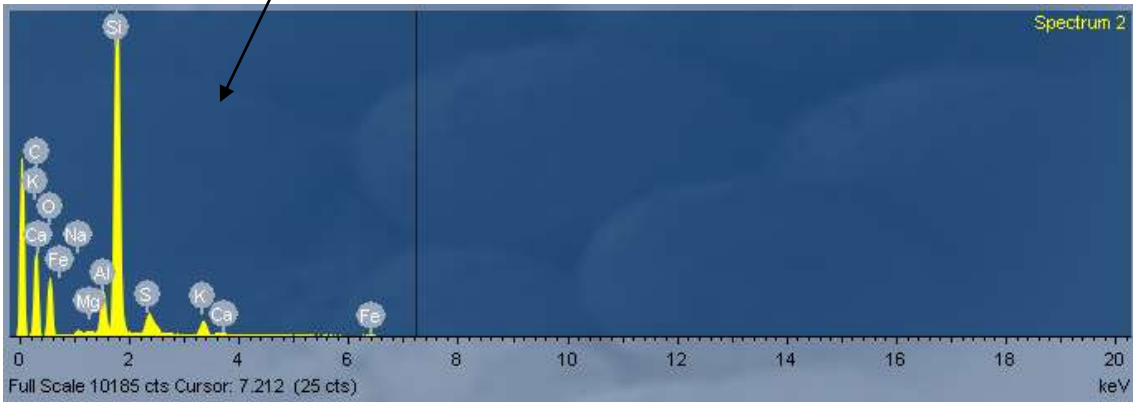


Layer primarily composed of silica probably resultant from the volcanic eruption

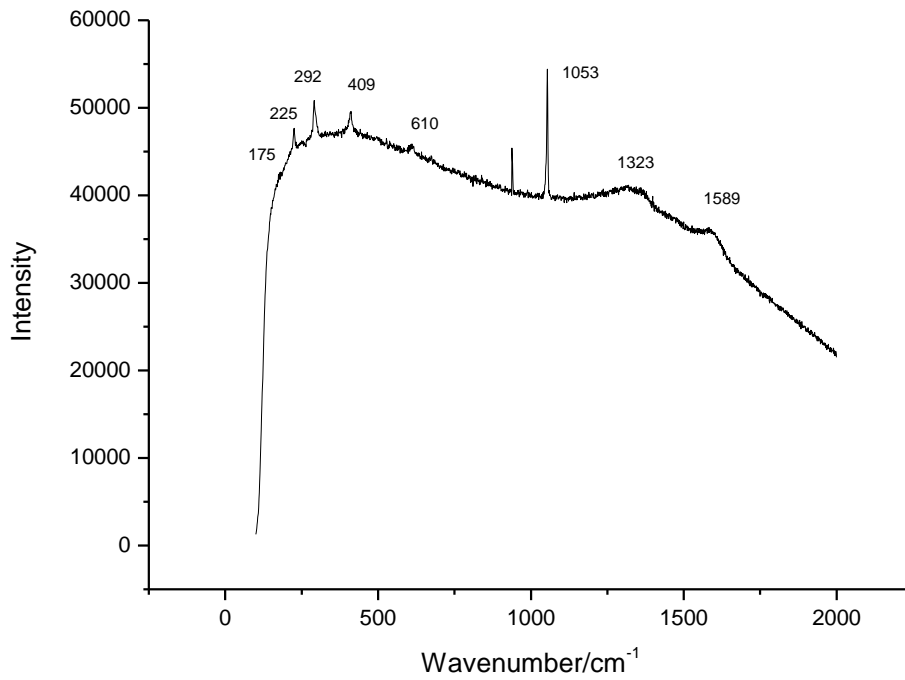
Detail of volcanic mud layer



SEM- EDX analysis of the volcanic mud layer, showing silicon as the main element



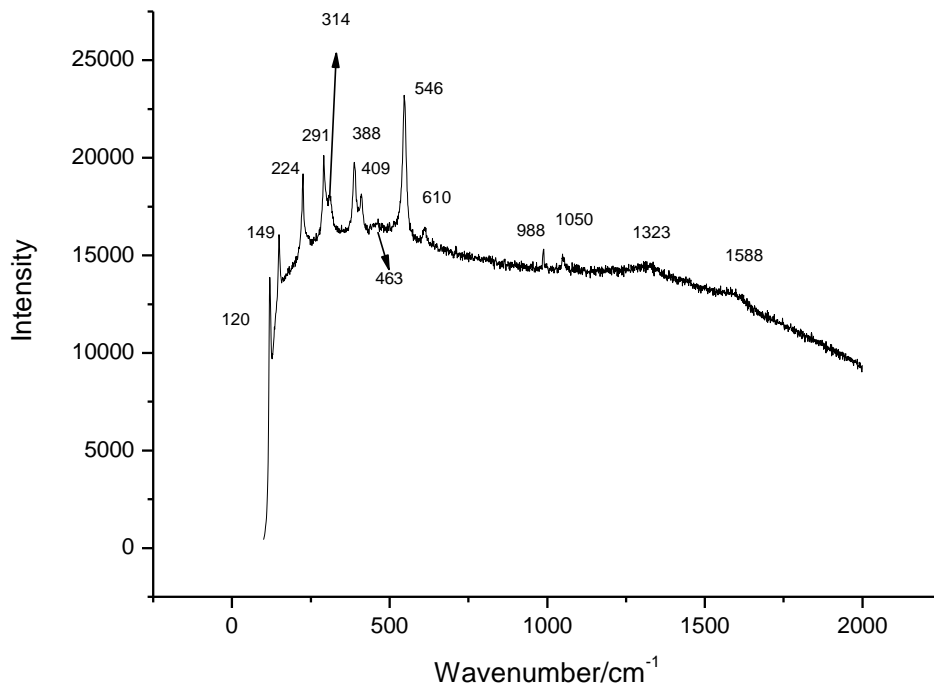
G – grey layer (2nd sequence)



sample 2a, grey layer (G), 3 scans, 5%power, pigments identified: lead white, carbon black, synthetic iron (III) oxide

G – Grey layer: lead white, carbon black, synthetic iron oxide (Burgio & Clark 2001: 1498; Bell *et al.* 1997: 2170, 2174) cosmic ray at 939.

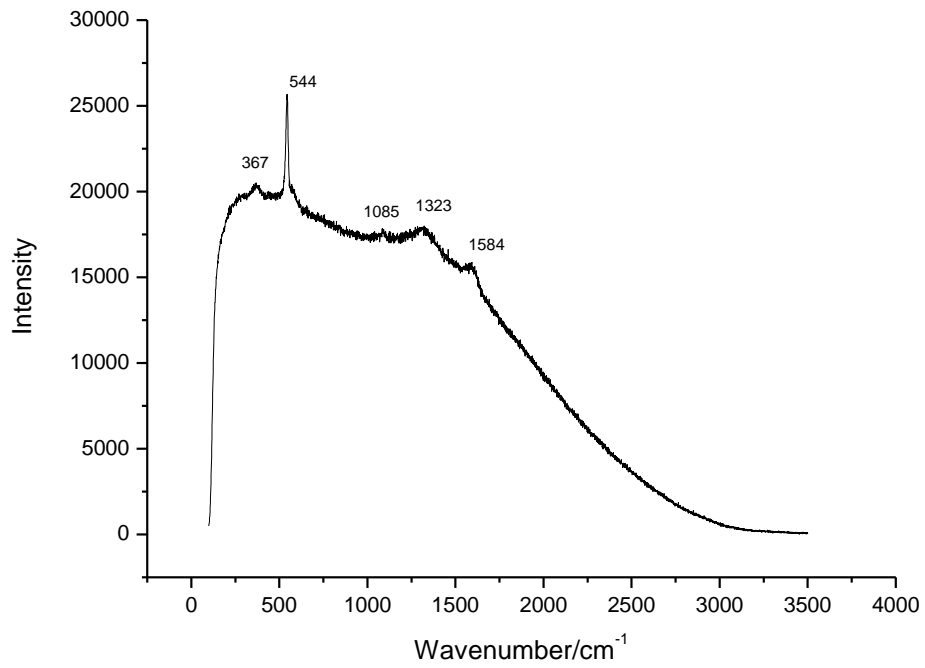
O₂ – Orange layer, UV fluorescence bright yellow (2nd sequence)



Sample 2a, orange 2 (O₂) layer, 1scan, 5% power, pigments identified: red lead, synthetic iron (III) oxide, lead white, barium sulfate)

O₂ – Orange layer: red lead, synthetic iron oxide and barium sulfate (Bell *et al.* 1997: 2173, 2174, 2175, Burgio & Clark 2001: 1494)

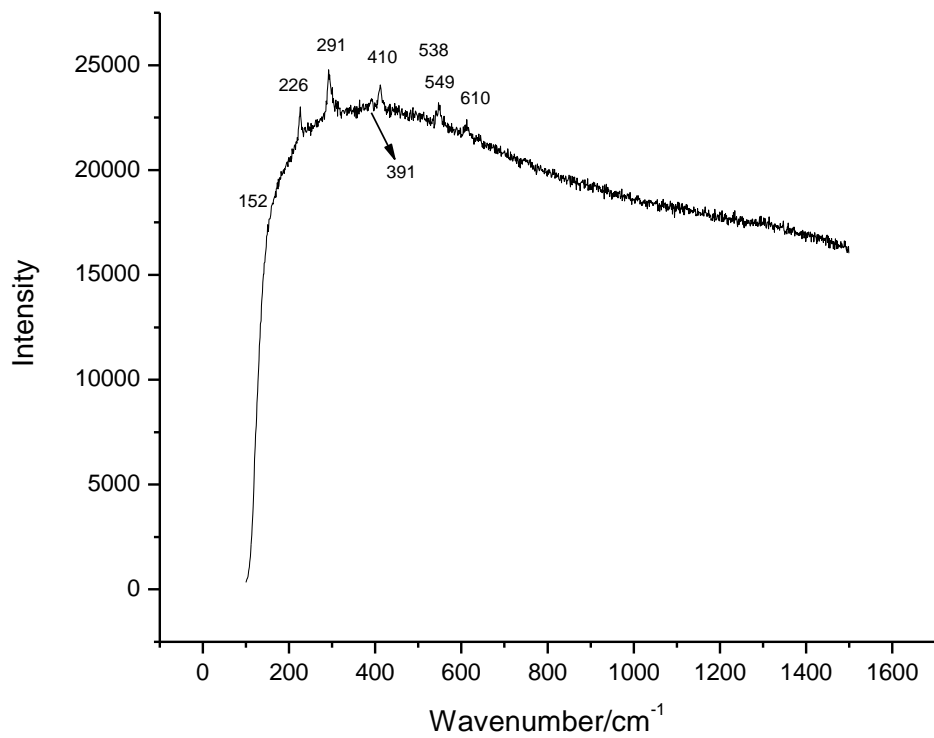
Bl₁- blue layer (2nd sequence)



Sample 2a, blue layer (bl₁), 1 scan, 5% power (pigments identified: ultramarine, carbon black, calcite)

Bl₁ – blue layer: ultramarine, calcite, carbon black, (Burgio, Clark 2001: 1492; Bell *et al.* 1997: 2170, 2175)

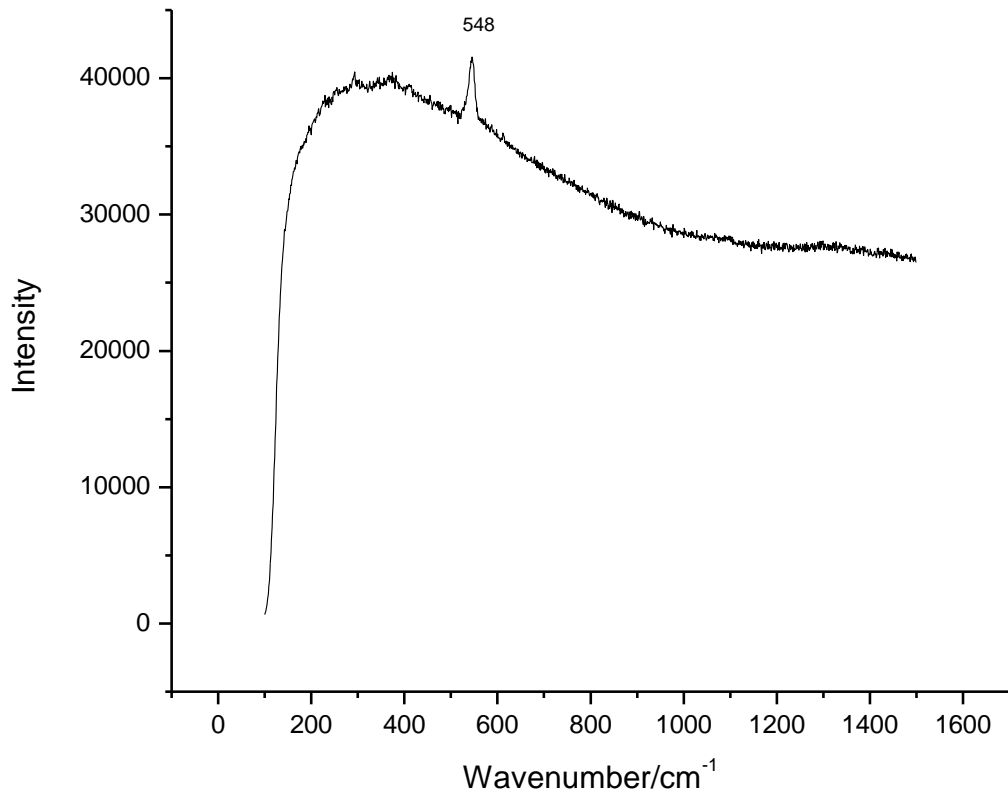
O₃ – orange layer, UV fluorescence dark red (3rd sequence)



Sample 2, orange layer (O₃), 1 scan, 1%power, pigments identified: iron oxide, red lead

O₃ - orange layer: synthetic iron oxide, red lead (missing 120 peak of red lead) (Bell *et al.* 1997: 2173, 2174)

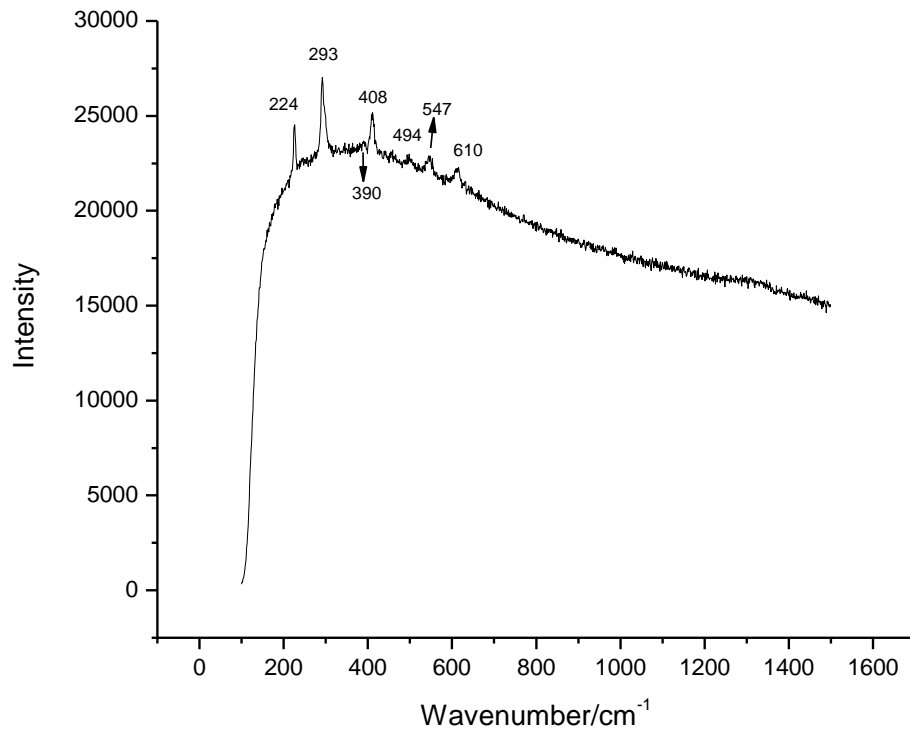
Bl_{1a} - blue layer (3rd sequence)



sample 2, Bl_{1a} layer, 1scan, 1% power, pigment identified: ultramarine

Bl_{1a} – blue layer: ultramarine (Bell *et al.* 1997: 2171)

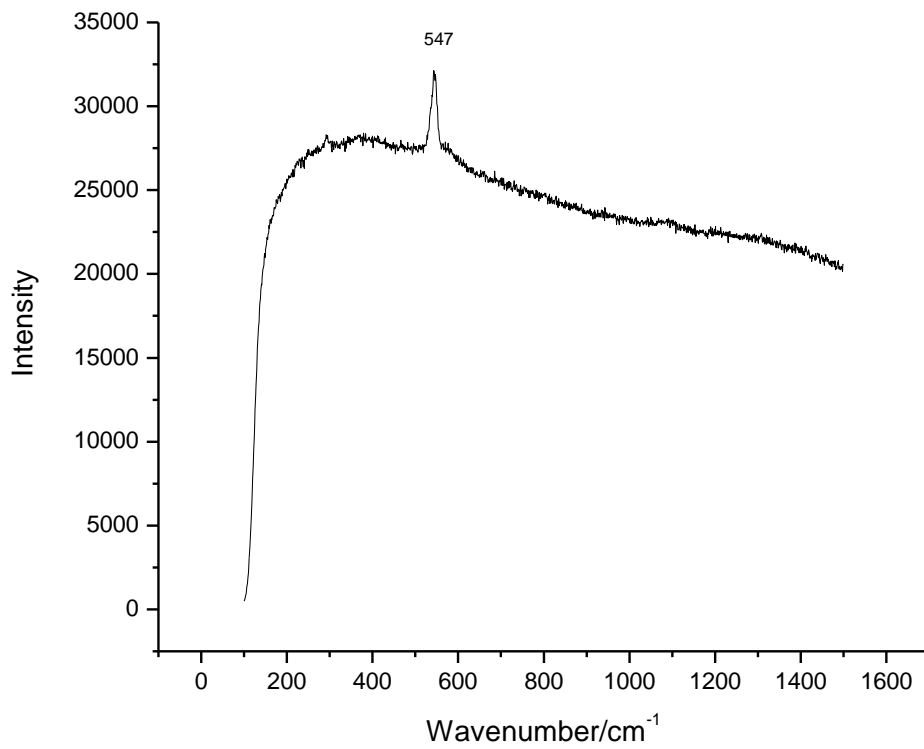
O_{3a} orange layer, UV fluorescence dark red (4th sequence)



sample 2, O_{3a} orange layer, 1 scan, 1% power, pigments identified: iron oxide, red lead

O_{3a} – orange layer: synthetic iron oxide, red lead (Bell *et al.* 1997: 2173, 2174) (121cm⁻¹ band of red lead missing)

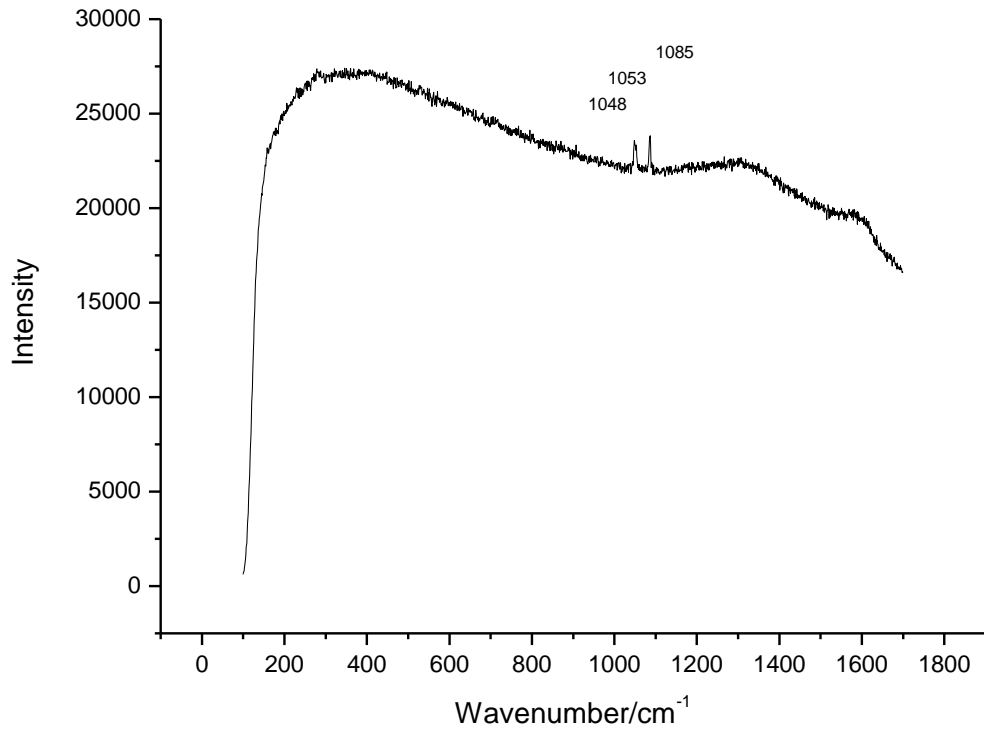
BI₂ blue layer (4th sequence)



sample 2, blue layer (BI₂), 1scan, 5% power, pigment identified: ultramarine

BI₂ – blue layer ultramarine (Bell *et al.* 1997: 2171)

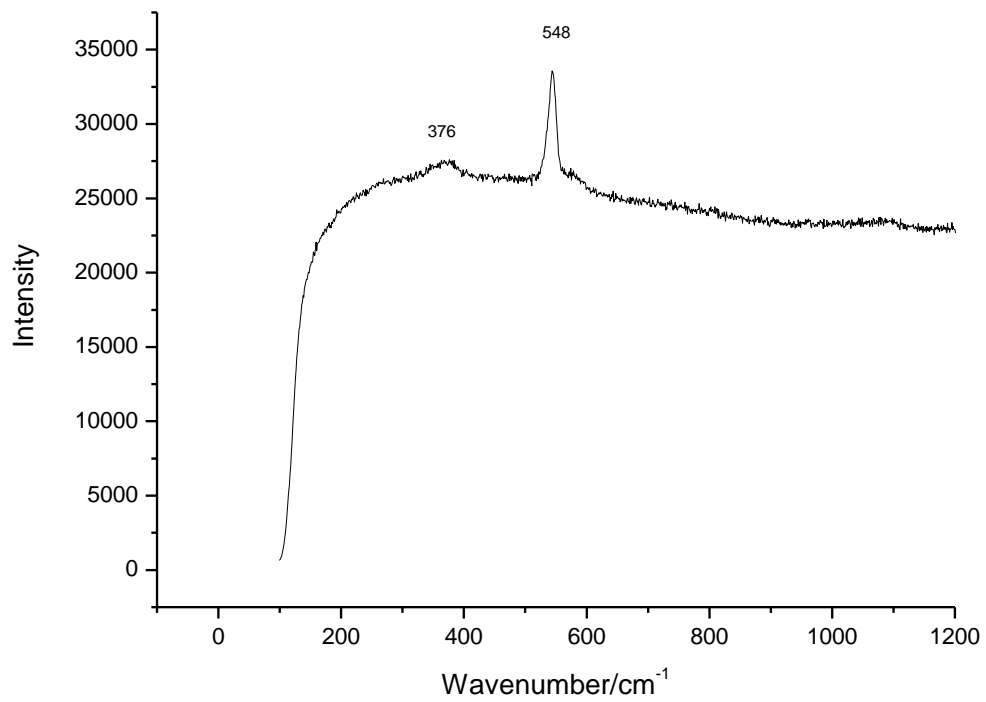
W_{1a} - white layer (4th sequence)



sample 2, white layer (W_{1a}) 3 scans, 5% power, pigments identified: lead white and calcite

W_{1a} – white layer: lead white and calcite (Bell *et al.* 1997: 2175)

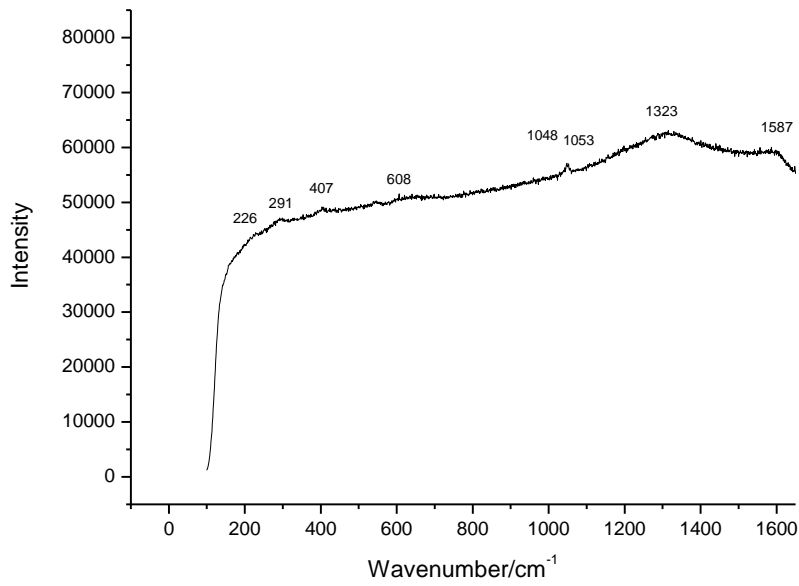
Bl_{2a} blue layer



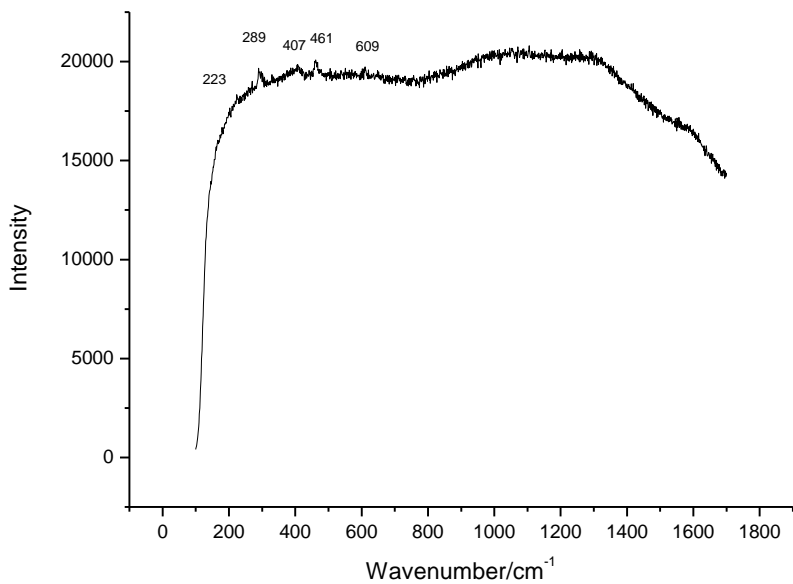
Sample 2a, blue layer (Bl₂), 1scan, 5%power, pigment identified: ultramarine

Bl_{2a} ultramarine(Burgio & Clark 2001: 1492)

B – beige layer



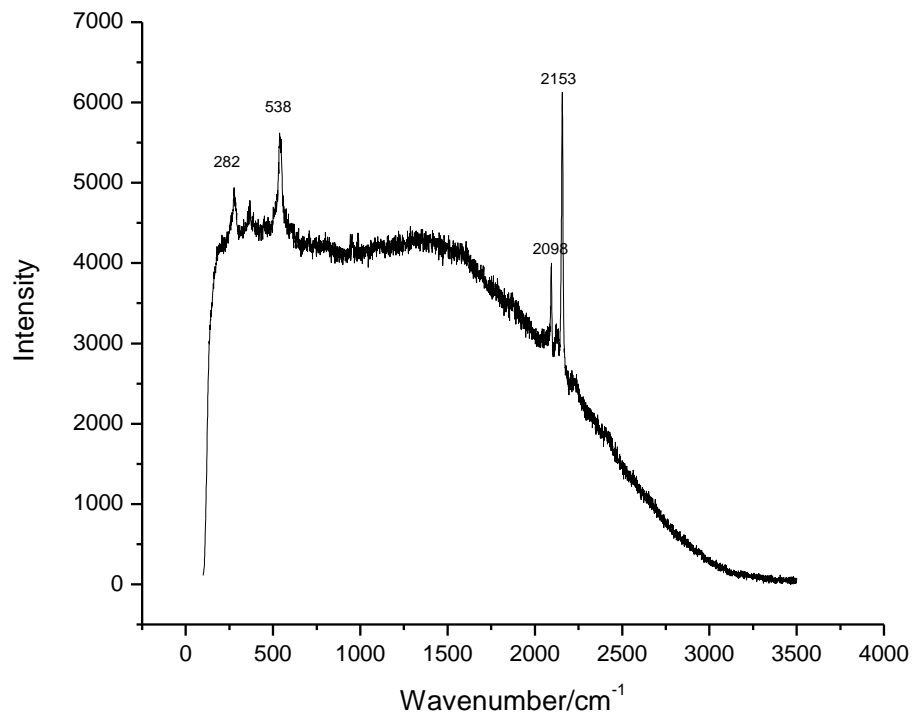
2a sample, beige layer, 1scan, 5%power, pigments identified: lead white, carbon black, synthetic iron (III) oxide



Sample 2a, beige layer, mais escura, 3scans, 5% power, pigments identified: iron oxide

B – beige layer: lead white, synthetic iron oxide (Bell *et al.* 1997: 2173;2174;2175)

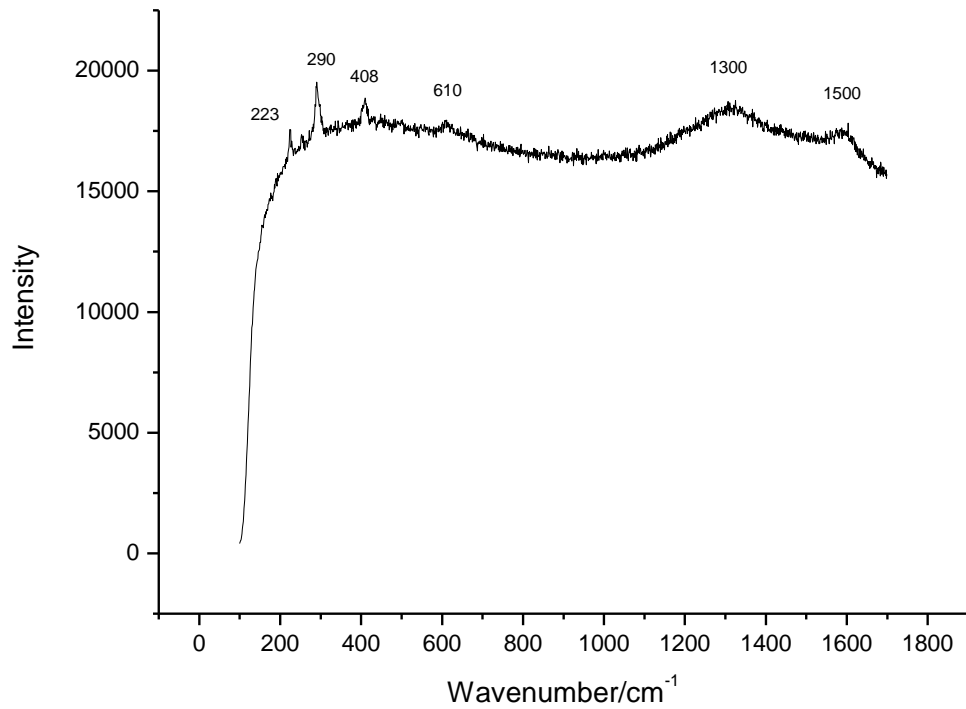
Bl₃ blue layer



sample T, blue layer (Bl₃), 3 scans, 1% power, pigment identified: prussian blue

Bl₃ – blue layer: prussian blue (Bell *et al.* 1997: 2171)

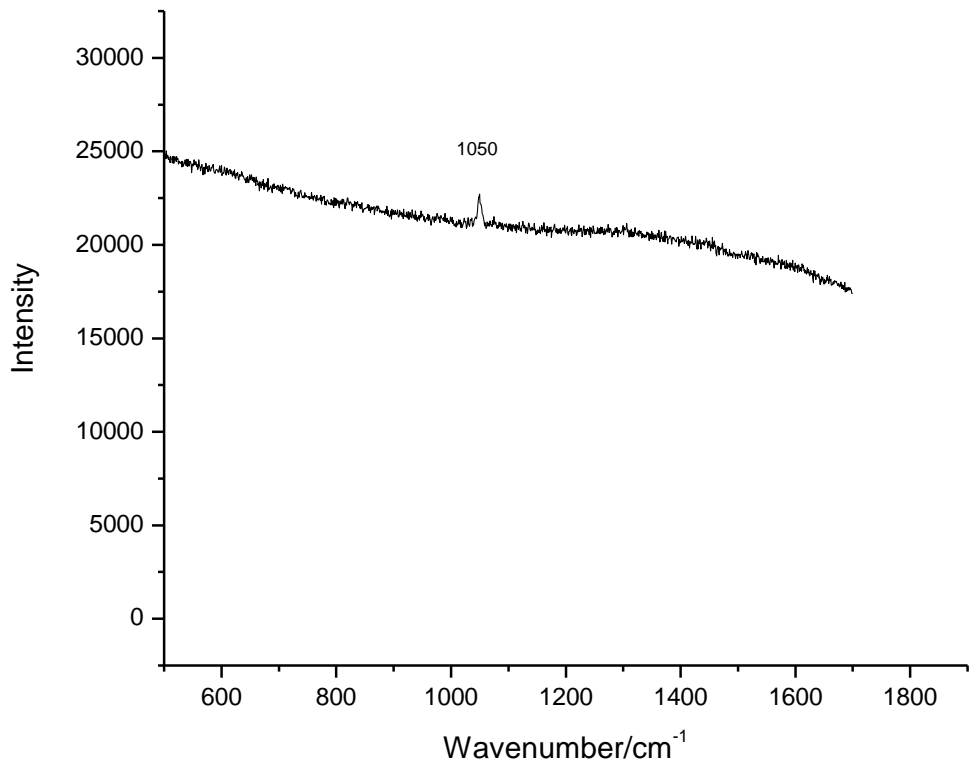
R_{1a} reddish layer



sample 2a, red layer (R_{1a}), 1 scan, 5% power, pigments identified: iron oxide, carbon black

R_{1a} iron oxide, carbon black (Burgio & Clark 2001: 1504; Bell *et al.* 1997: 2173, 2170)

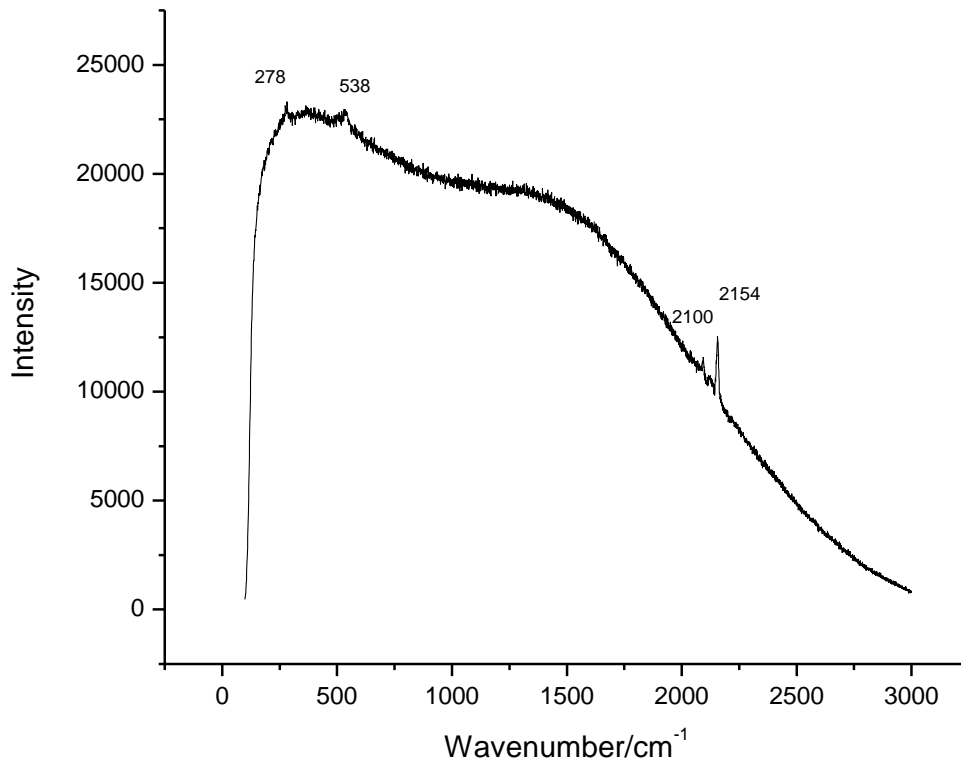
W₁ white layer



Sample 7, white layer (W₁), 1 scan, 1%power, pigment identified: lead white

W₁ - white layer: lead white (Bell *et al.* 1997: 2175)

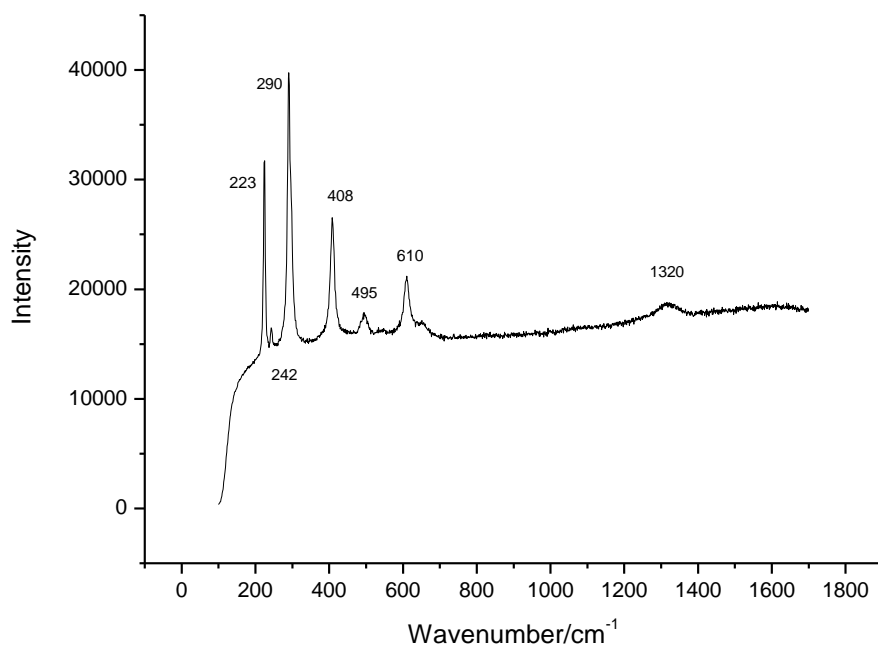
Bl_{3a} blue



sampleG2, blue layer (Bl_{3a}), 1 scan, 1% power, pigment identified: prussian blue

Bl_{3a} – blue layer: prussian blue (Bell *et al.* 1997: 2171)

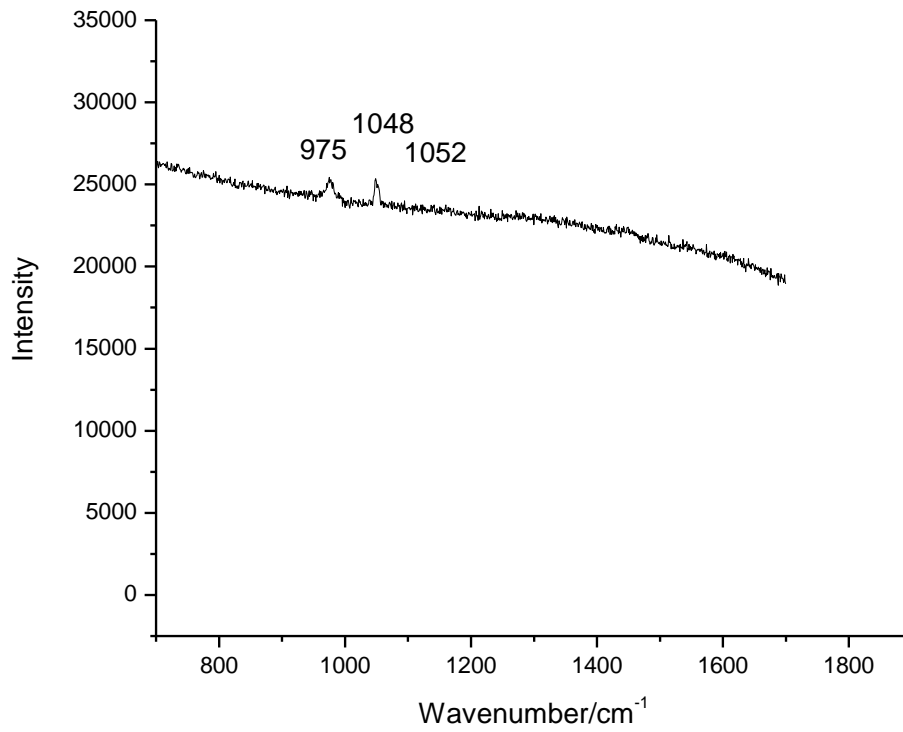
R₁ – reddish layer



Sample 2a, red layer (R₁), 1scan, 5% power, pigments identified: iron oxide, carbon black

R₁ – reddish layer: iron oxide, carbon black (Burgio & Clark 2001: 1504; Bell *et al.* 1997: 2173, 2170)

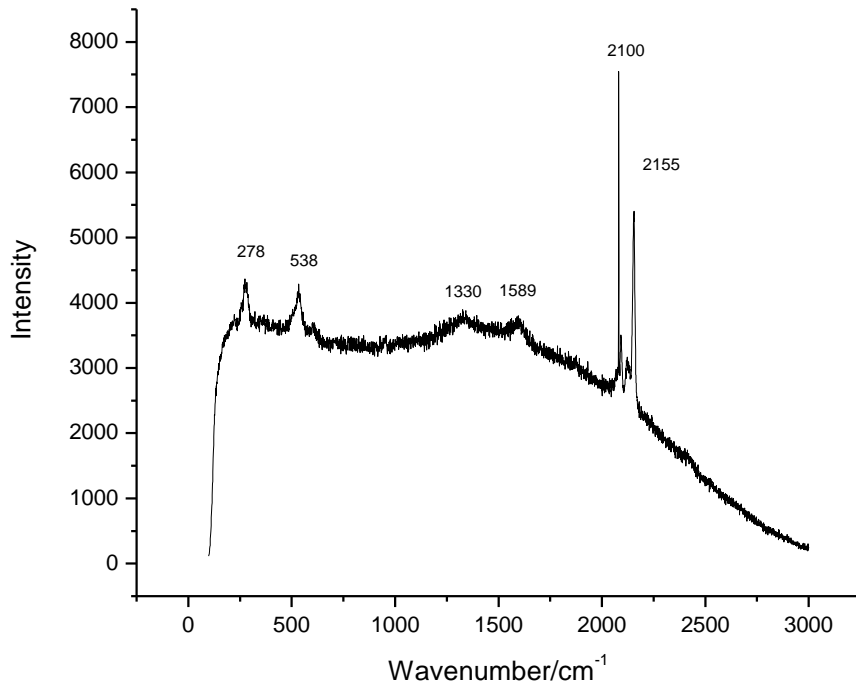
W₂ - white layer



Sample 7, white layer (W₂), 1 scan, 1%power, pigments identified: lead white, lead sulfate

W₂ lead white and lead sulphate (Burgio & Clark 1997: 1498)

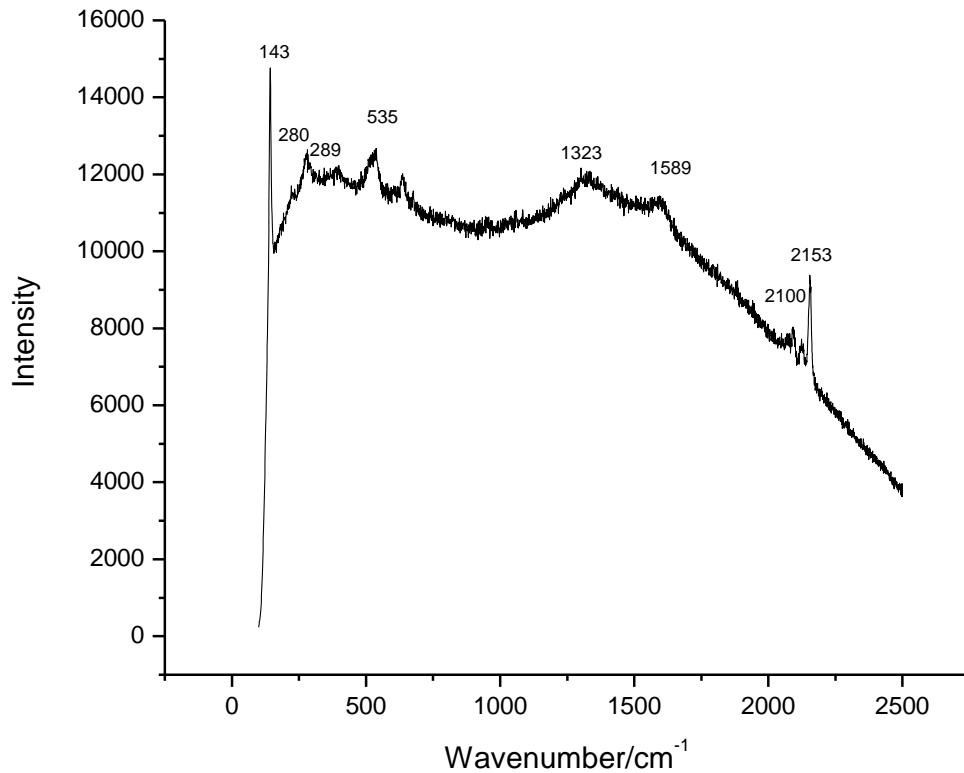
Bl₄ blue layer



sample G2, blue layer (bl₄), 1 scan, 1% power, pigments identified: prussian blue, carbon black

Bl₄ - blue layer: prussian blue, carbon black (Bell *et al.* 1997: 2170, 2171)

Bl_{4a} – blue layer (last sequence before window removal)

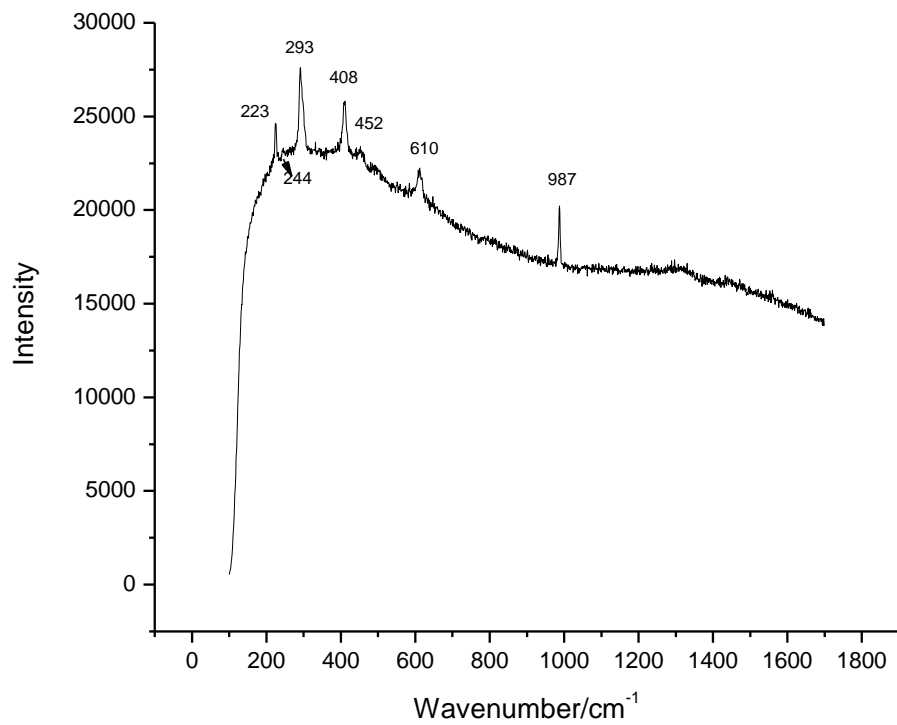


sample G2, blue layer (bl_{4a}), 1 scan, 1%power, pigments identified: prussian blue, lead white

Bl_{4a} – blue layer: Prussian blue and lead white (Ernst 2010: 279)

The mixture of lead white and Prussian blue is particularly susceptible to damage by the laser power. This damage results in the attenuation of the main bands of lead white (1050cm⁻¹) and of Prussian blue (2154cm⁻¹), and in the appearing of new bands at 143cm⁻¹ and 289cm⁻¹.

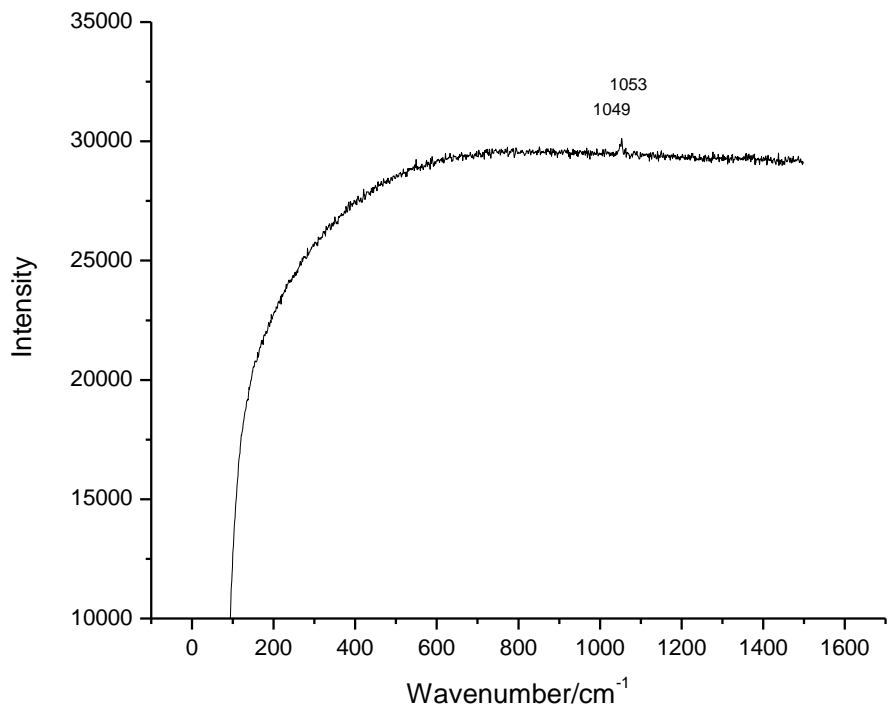
O₄ – pink layer (last sequence before window removal)



sample 2a, pink layer (O₄), 1 scan, 5% power, pigments identified: iron oxide, barium sulfate

O₄ – pink layer: iron oxide, barium sulfate (Burgio & Clark 2001: 1504, 1494)

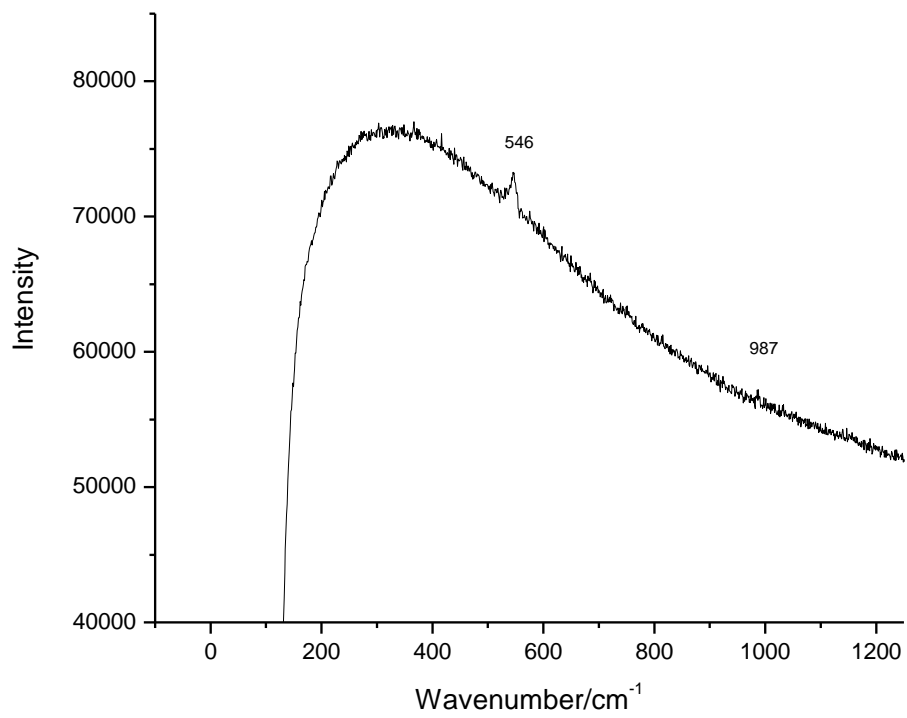
W₃ – white layer



sample V, white layer (W₃), 1 scan, 1% power, compound identified: lead white

W₃ – white layer: lead white (Burgio & Clark 1997: 1498)

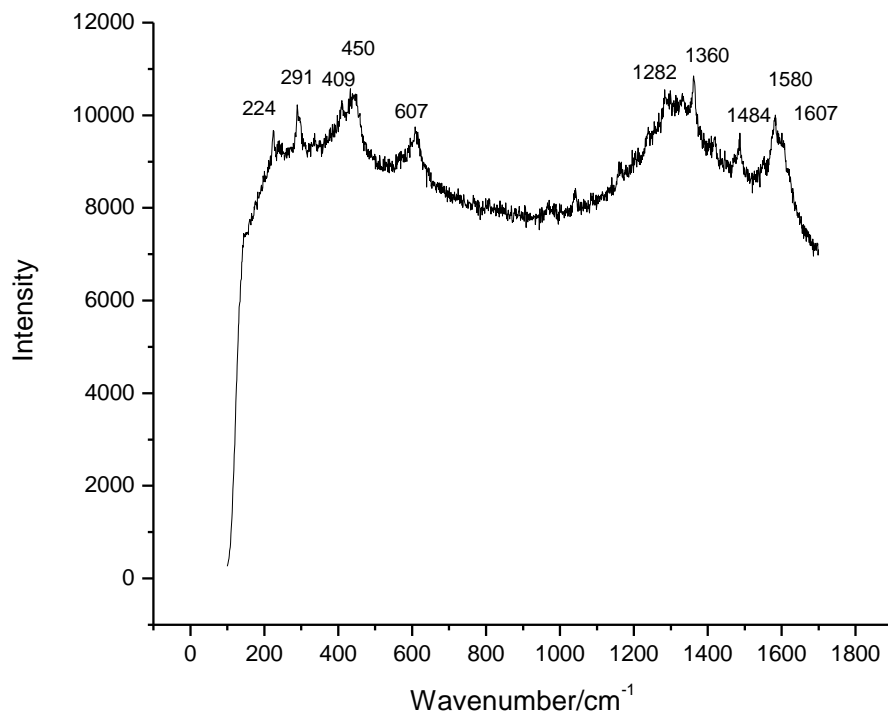
BI₅ - light blue layer



sample Z, light blue layer (BI₅), 1 scan, 1% power, pigments identified: ultramarine, barium sulfate

BI₅ – light blue layer: ultramarine, barium sulfate (Burgio & Clark 2001: 1492,1494)

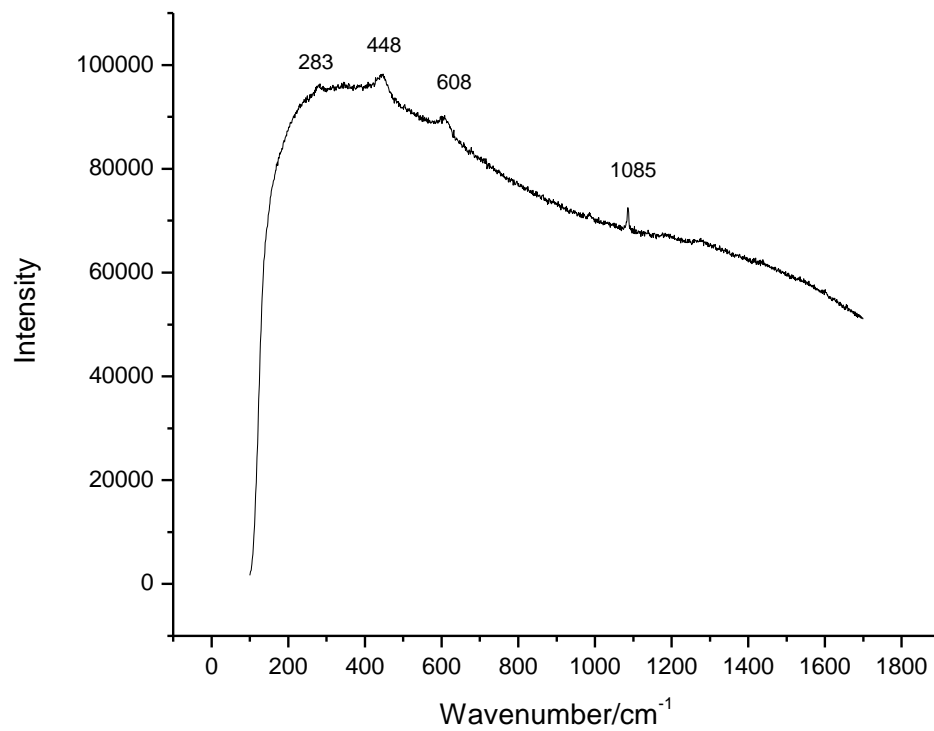
R₂/R₃ – pink layer



sample 7, pink layer (R₃), 1 scan, 1% power, pigments identified: pigment red 112, iron oxide

R₂/R₃ – pink layer: Pigment red 112 (PR 112) (1939), iron oxide (Burgio & Clark 2001: 1497, 1504)

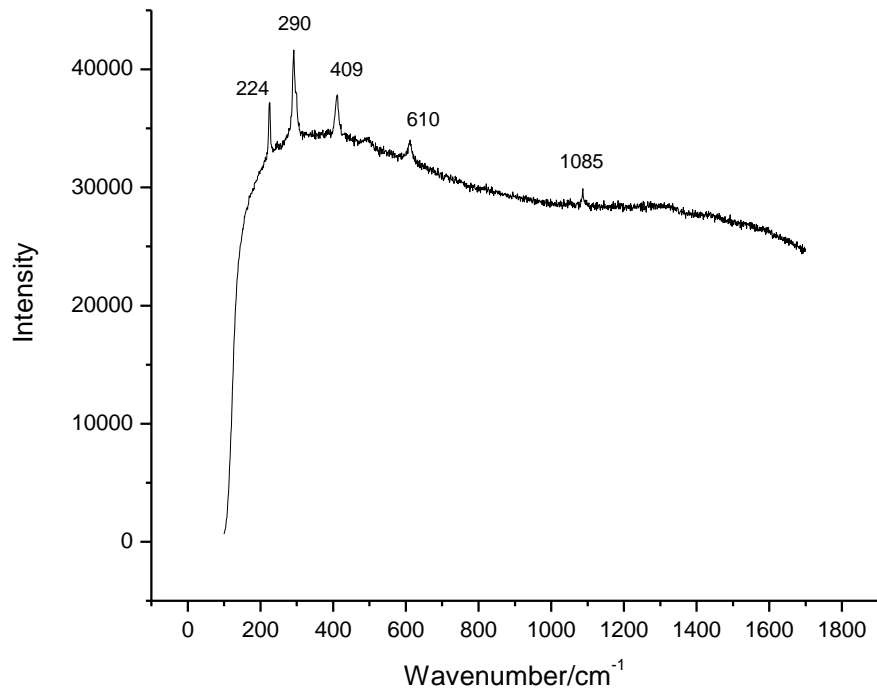
W₄ white layer



Sample 7, white layer (W₄), 1 scan, 1% power, pigments identified: rutile, calcite

W₄ – white layer: rutile, calcite (Burgio & Clark 2001: 1494)

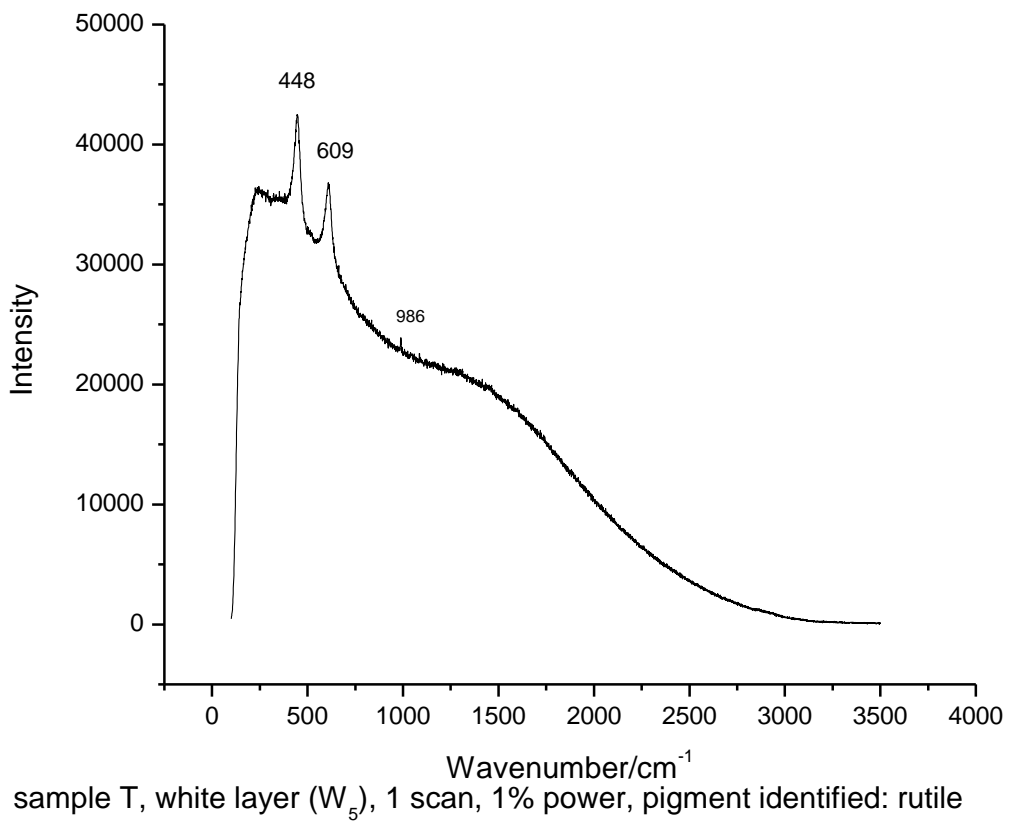
R₄ reddish layer



sample 7, red layer (R₄), 1 scan, 1% power, pigments identified: iron oxide, calcite

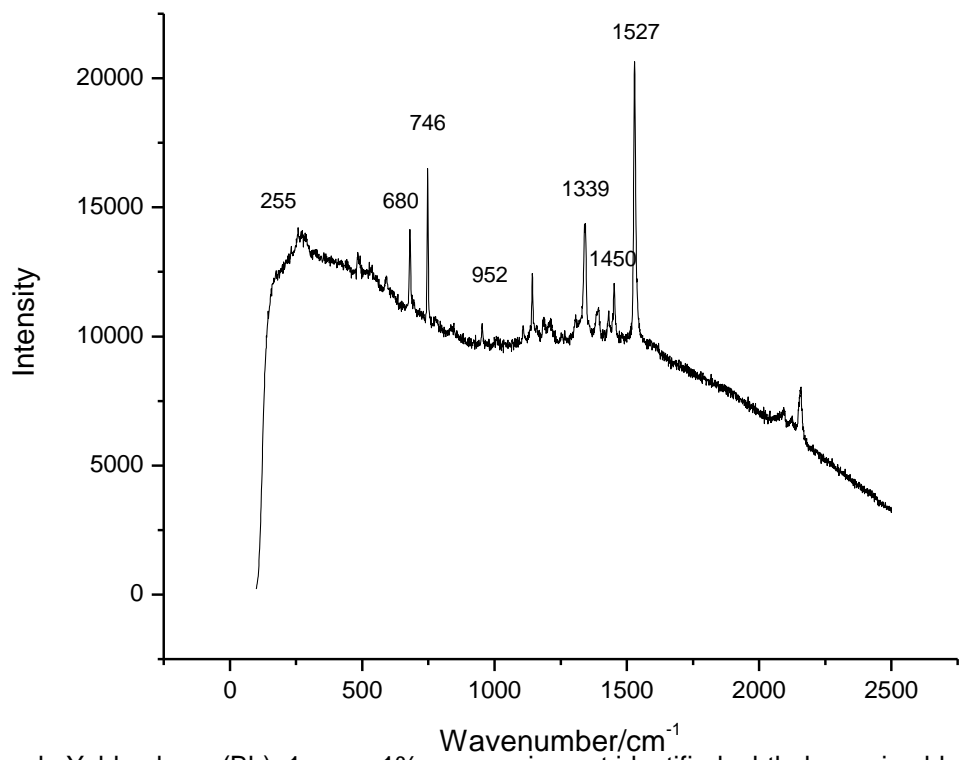
R₄ - reddish layer: iron oxide, calcite (Bell *et al.* 1997: 2173;2174;2175)

W₅ white layer



W₅ – white layer: rutile, barium sulfate (Burgio & Clark 2001: 1494)

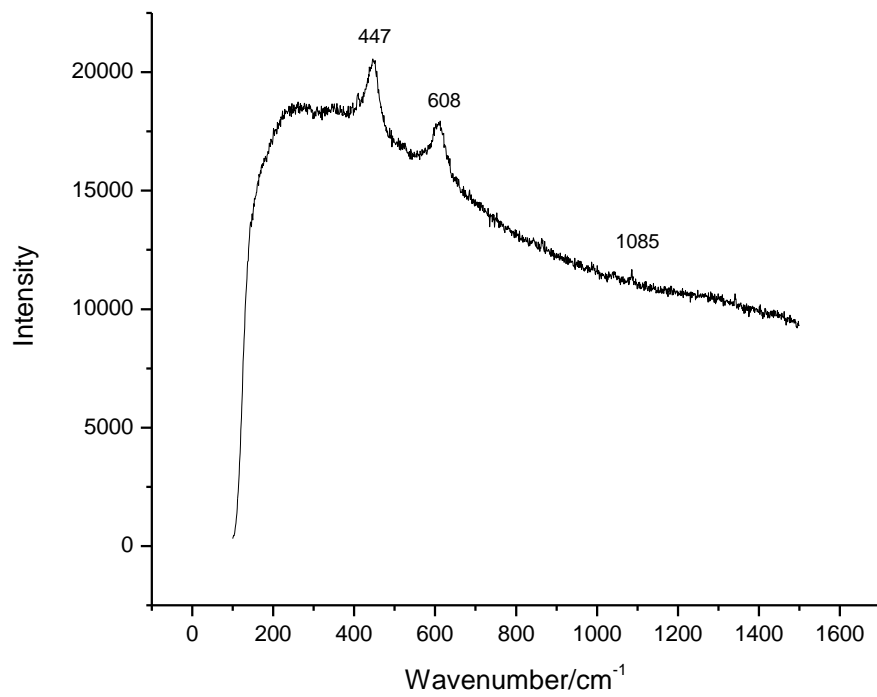
$^{111}\text{Bi}_6$ blue layer



sample Y, blue layer (Bi_6), 1 scan, 1% power, pigment identified: phthalocyanine blue

Bi_6 – blue layer: phthalocyanine blue (Burgio & Clark 2001: 1502)

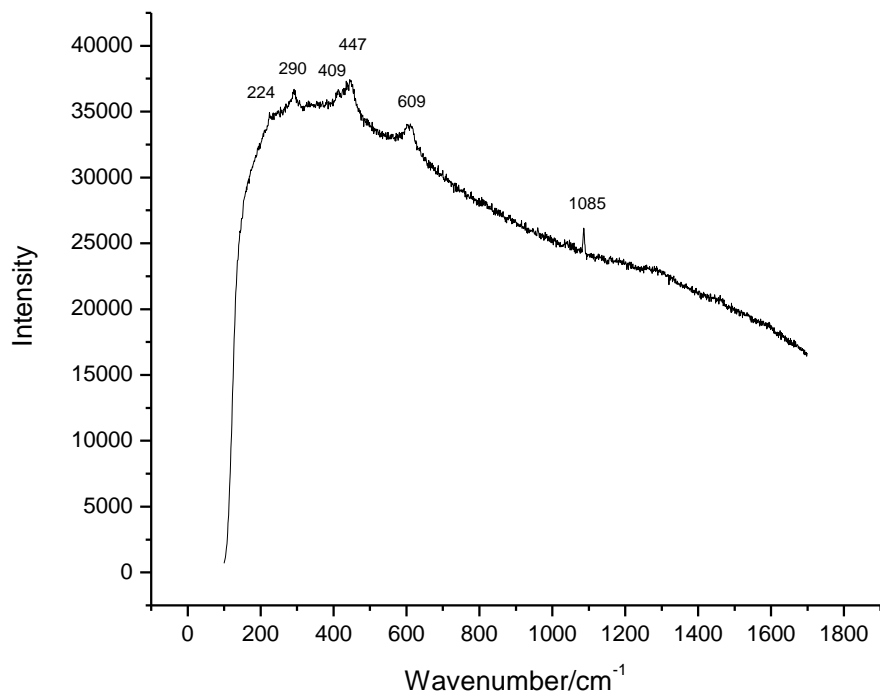
W₆ white layer (last sequence)



sample W, white layer (W₆), 1 scan, 1% power pigments identified: rutile, calcite

W₆ – white layer: rutile, calcite (Burgio & Clark 2001: 1494)

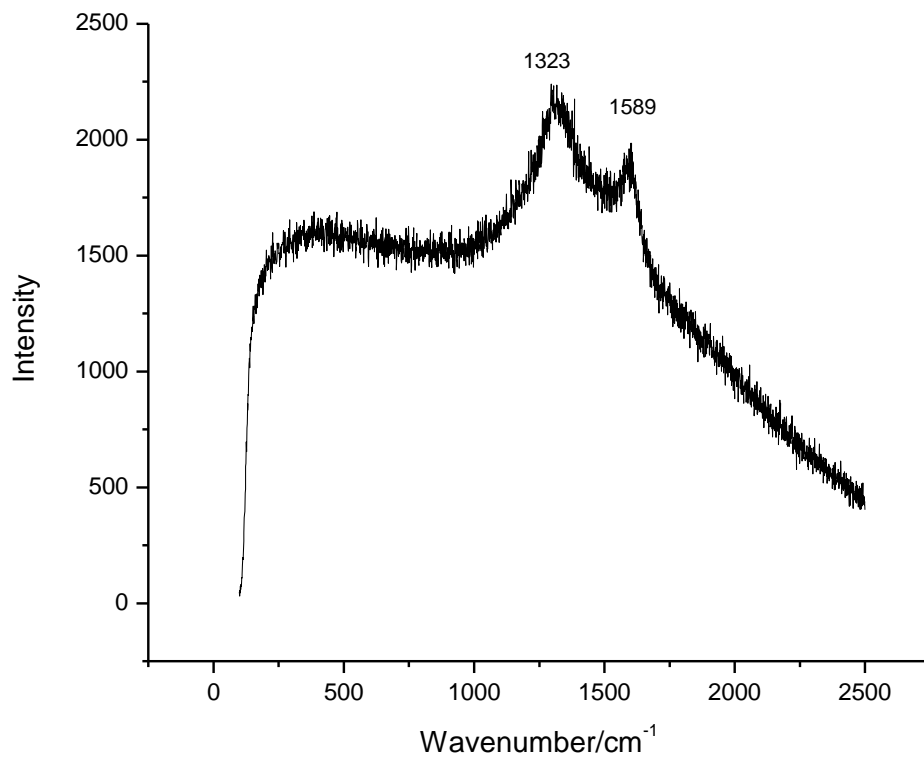
R₅ pink layer (last sequence)



sample 7, pink layer (R₅), 1% power, pigments identified: rutile, iron oxide, calcite

R₅ – pink layer: rutile, iron oxide, calcite (Burgio & Clark 2001: 1494; 1504)

P₁ black layer (last sequence)



sample Y, black layer (P₁), 1 scan, 1% power, pigment identified: carbon black

P₁ – black layer: carbon black (Bell et al. 1997: 2170)