Supplementary informations

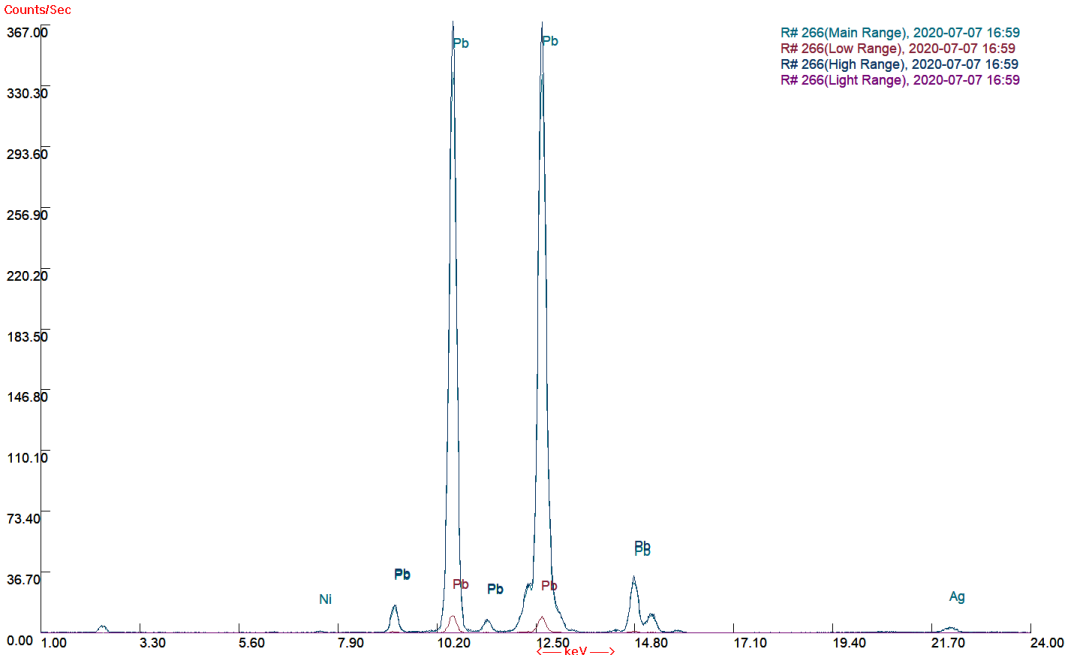
The pigments of the painter Fleury Richard (1777-1852), a model for multidisciplinary study

Davy Carole 1,*, Erika Wicky 2,*, Amina Bensalah-Ledoux 3, Stéphane Paccoud 4, Cécile Le Luyer 3, Anne Pillonnet 3 and Gérard Panczer 3

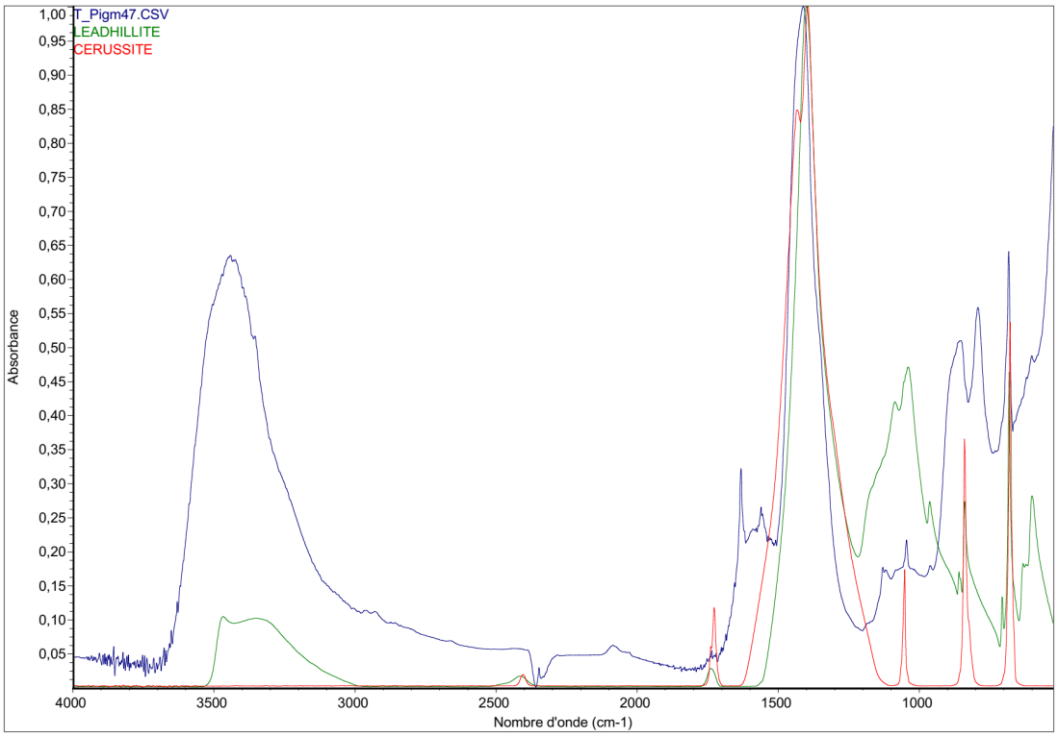
SI1 : Spectral data of the pigmented powders

Table 1

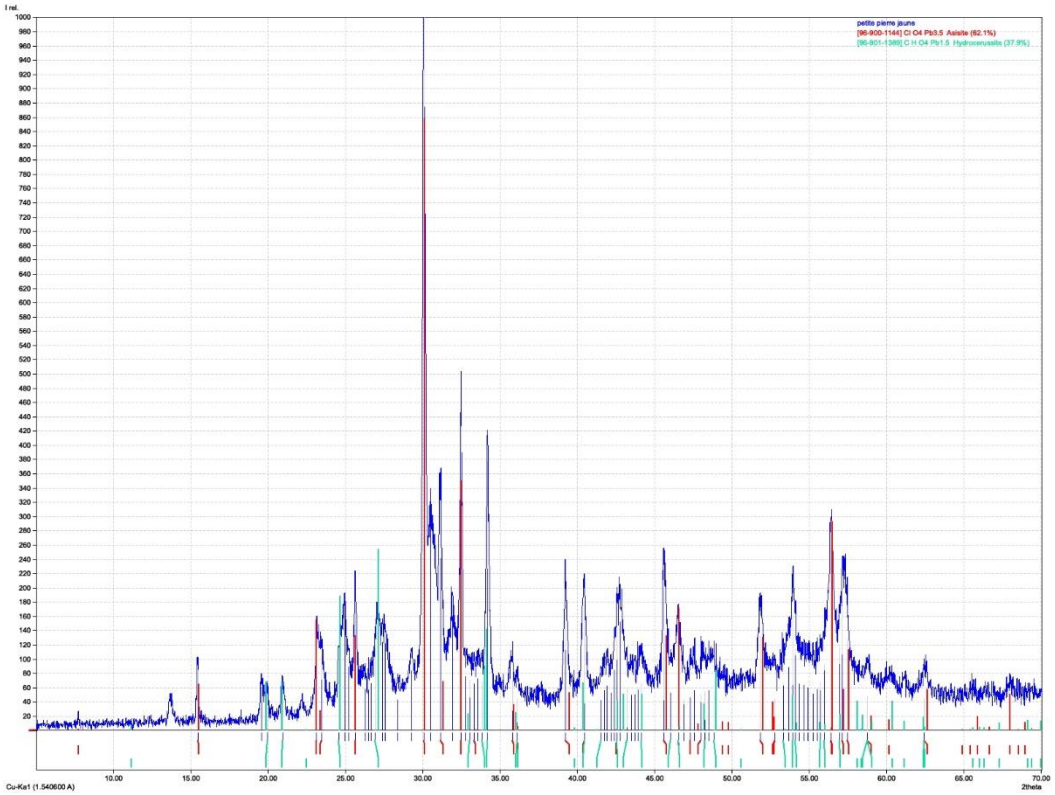
P47 Petite pierre jaune



Pigment n°47 #266 Petite pierre jaune XRF

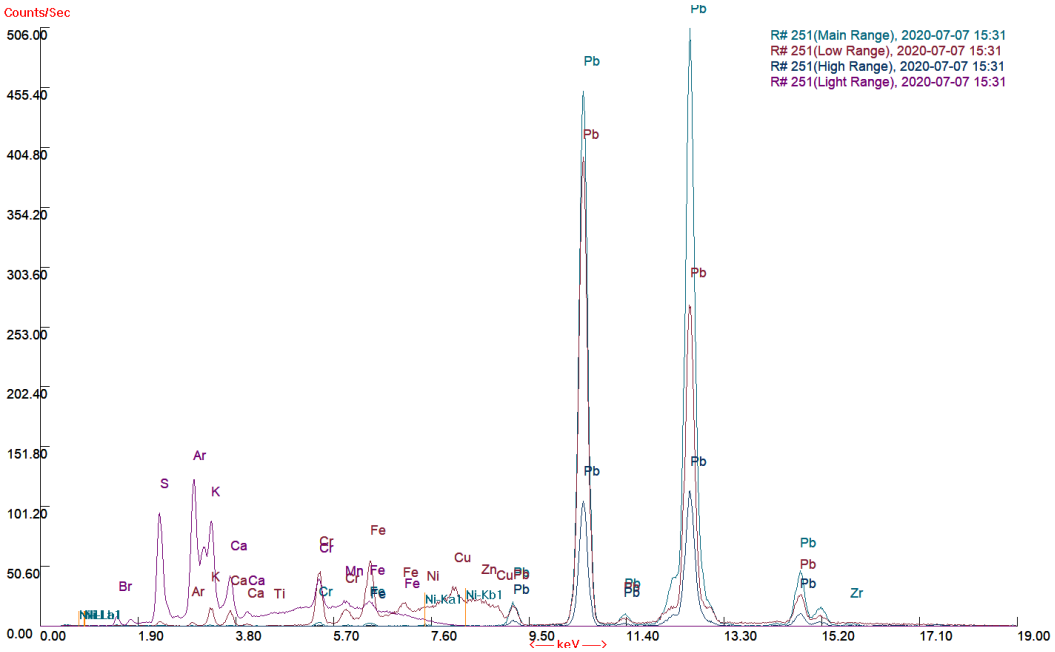


P47 FTIR

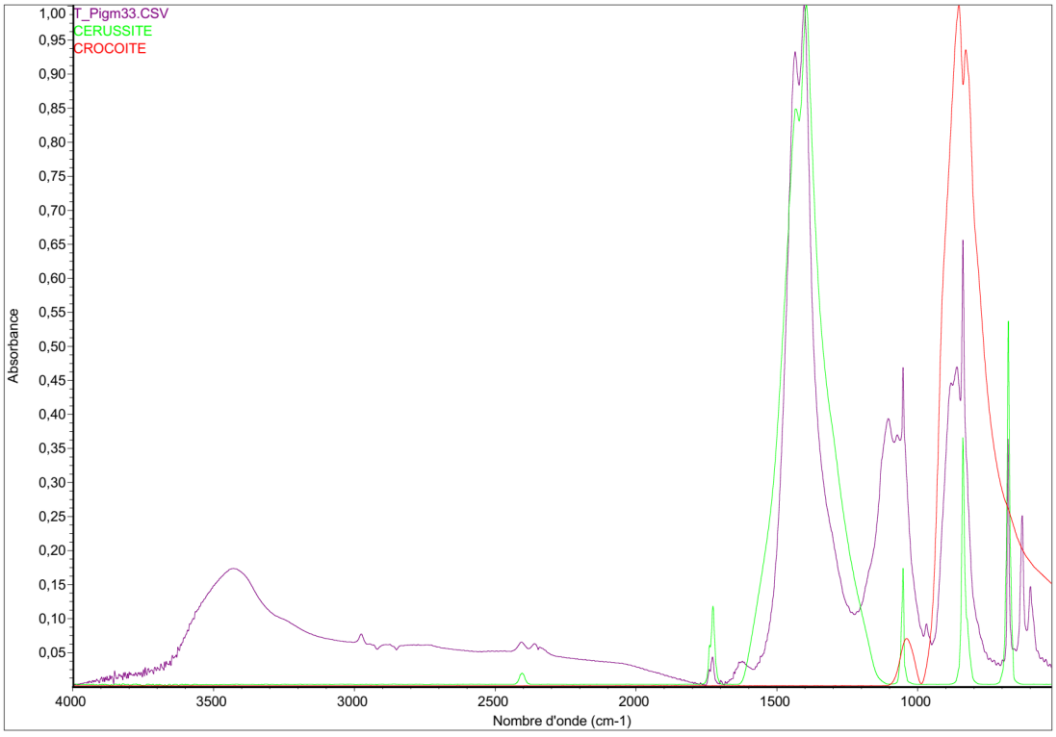


P47 XRD

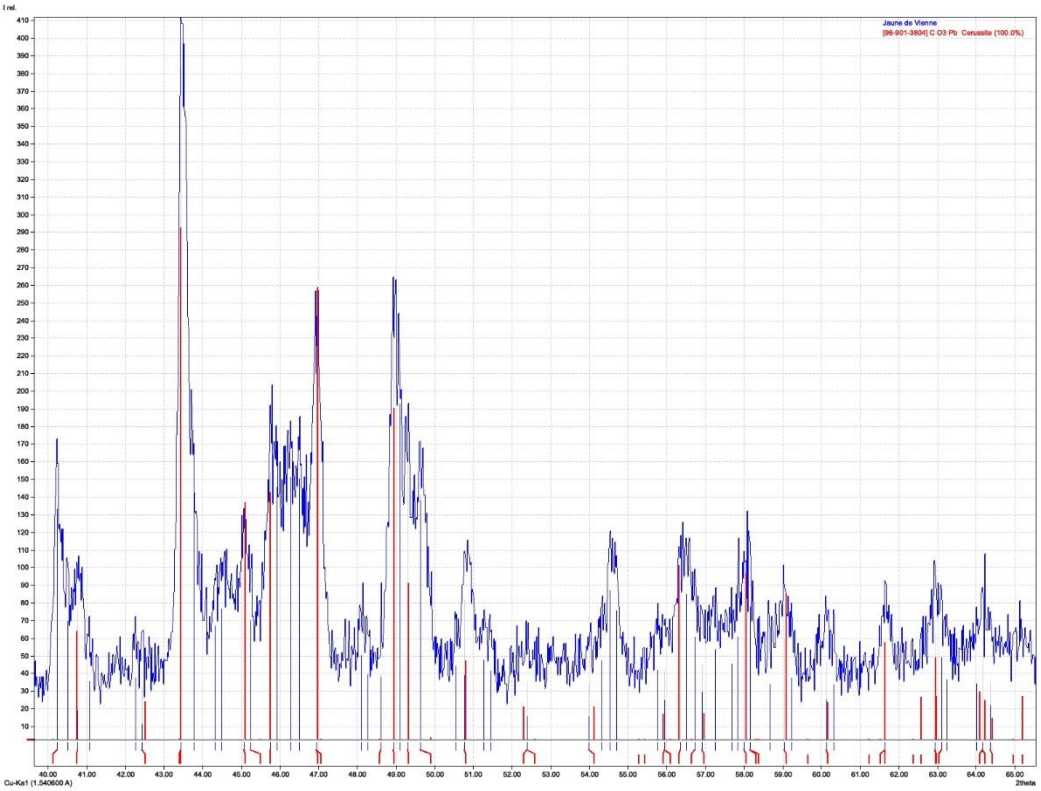
P33 Jaune de Vienne



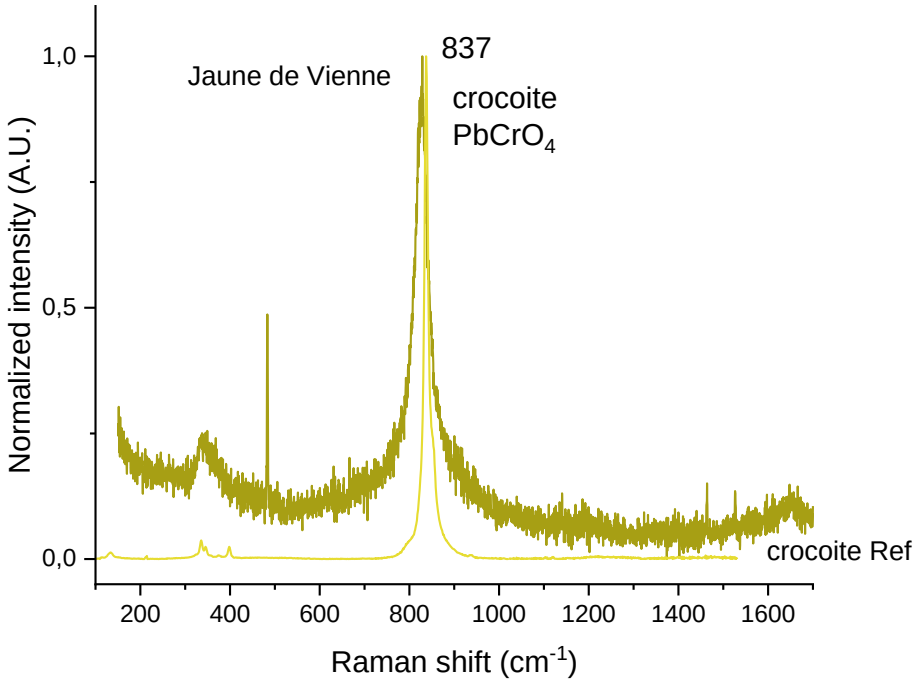
Pigment n°33 #251 Jaune de Vienne XRF



P33 FTIR

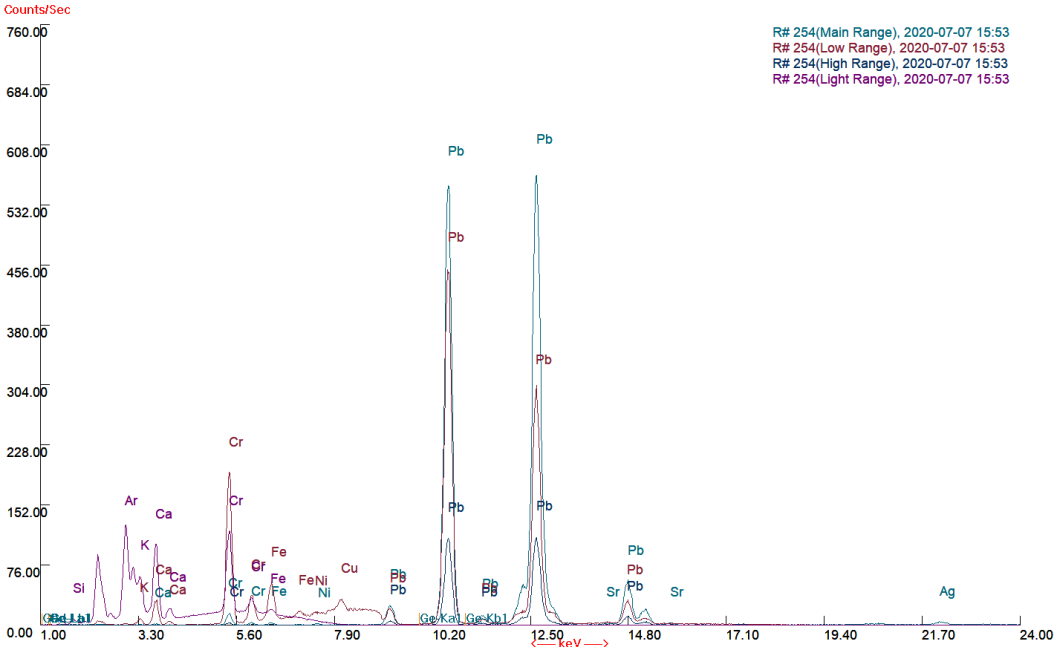


P33 XRD

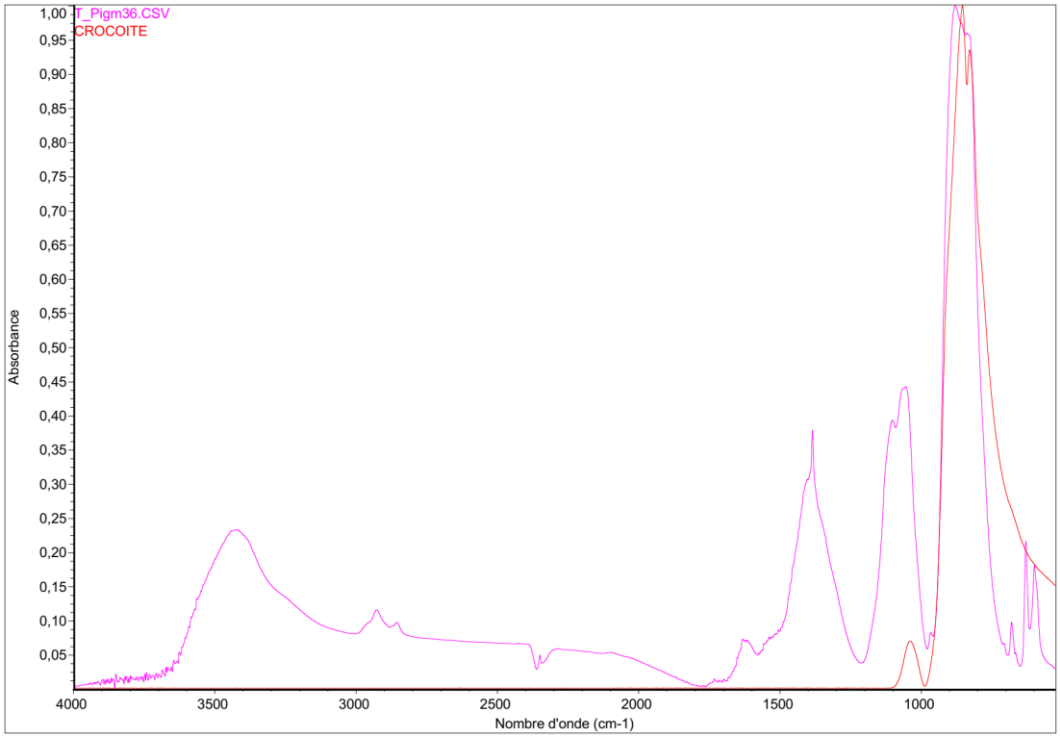


P33 Raman (compared to crocoite reference)

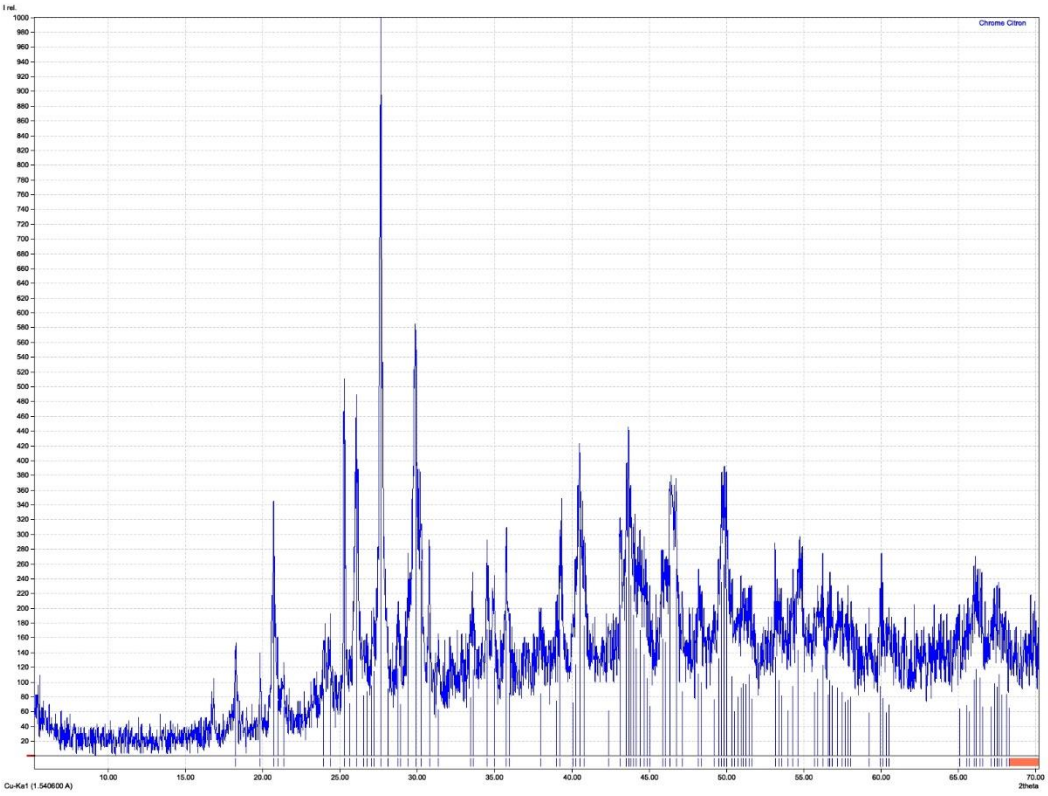
P36 Chrome Citron



Pigment n°36 #254 Chrome Citron XRF

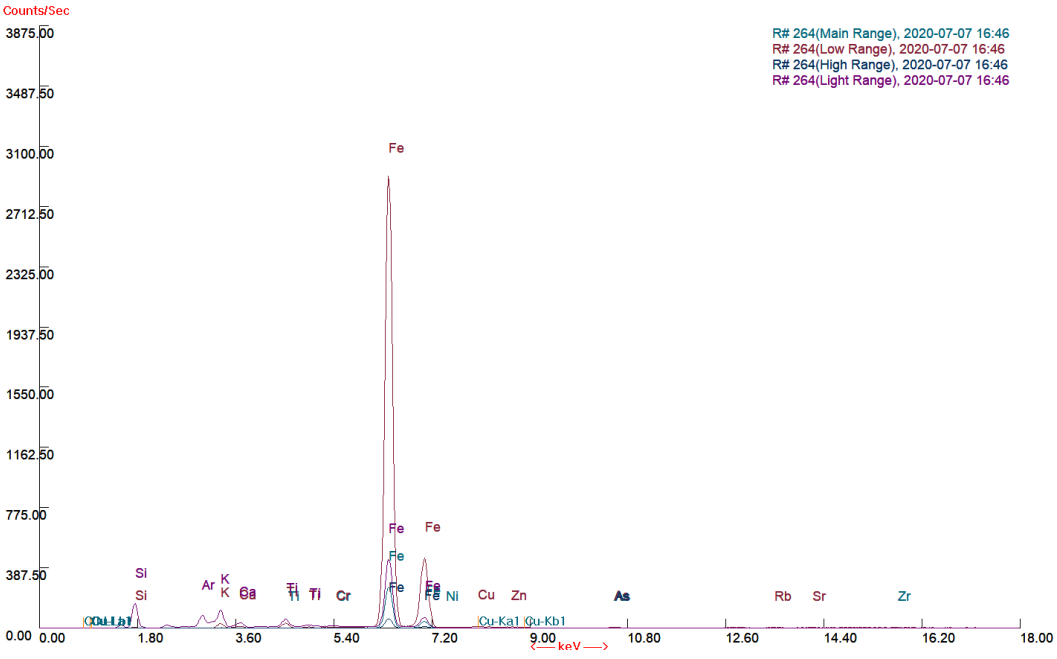


P36 FTIR

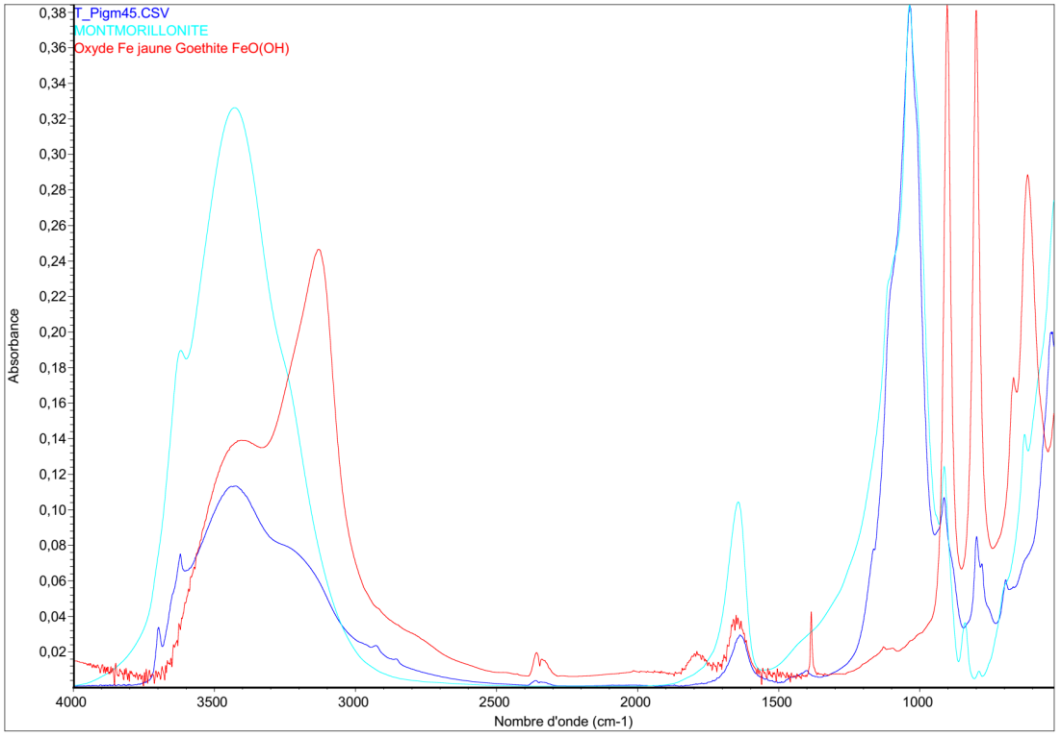


P36 XRD

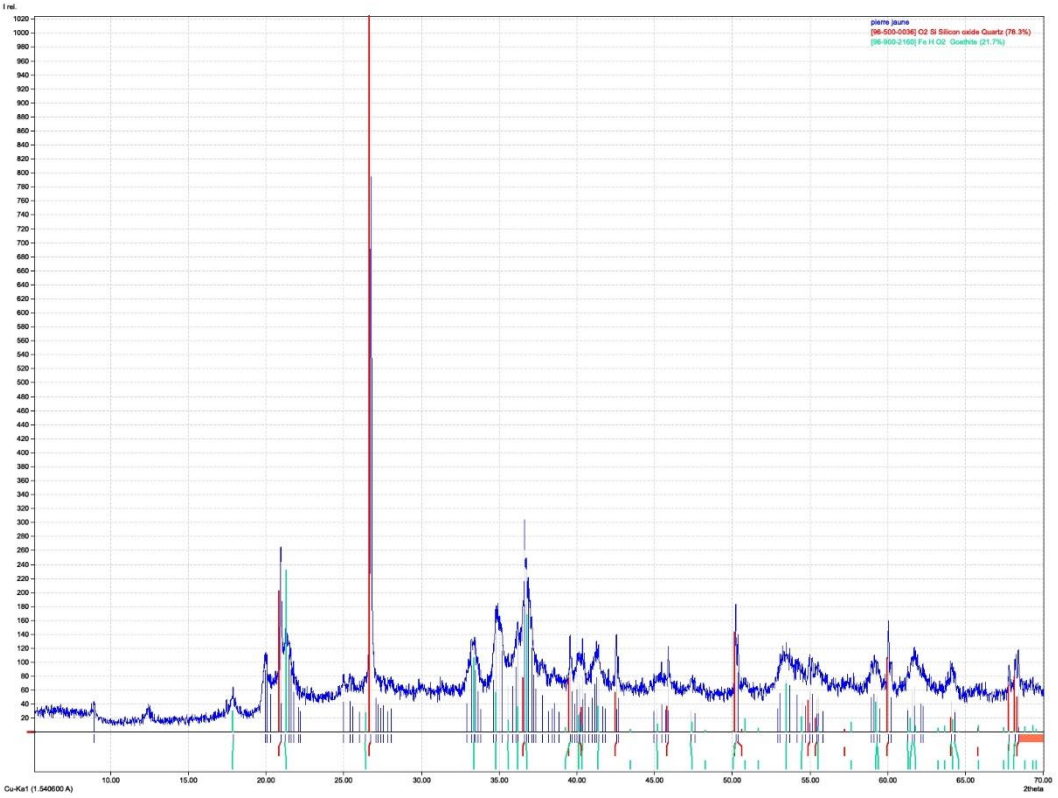
P45 Pierre Jaune



Pigment n°45 #264 Pierre Jaune XRF

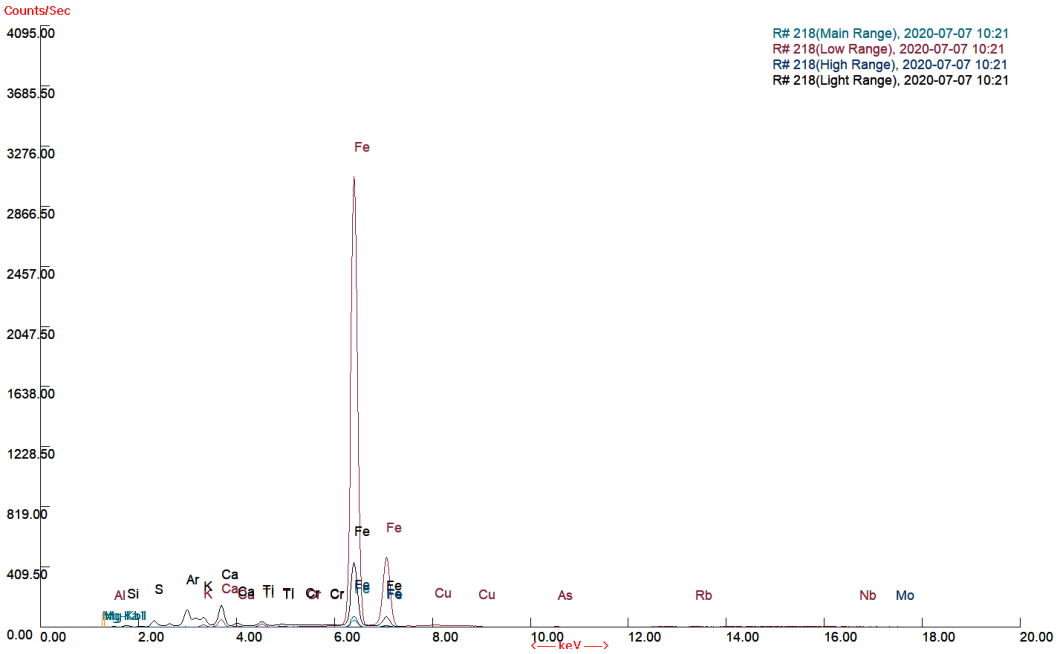


P45 FTIR

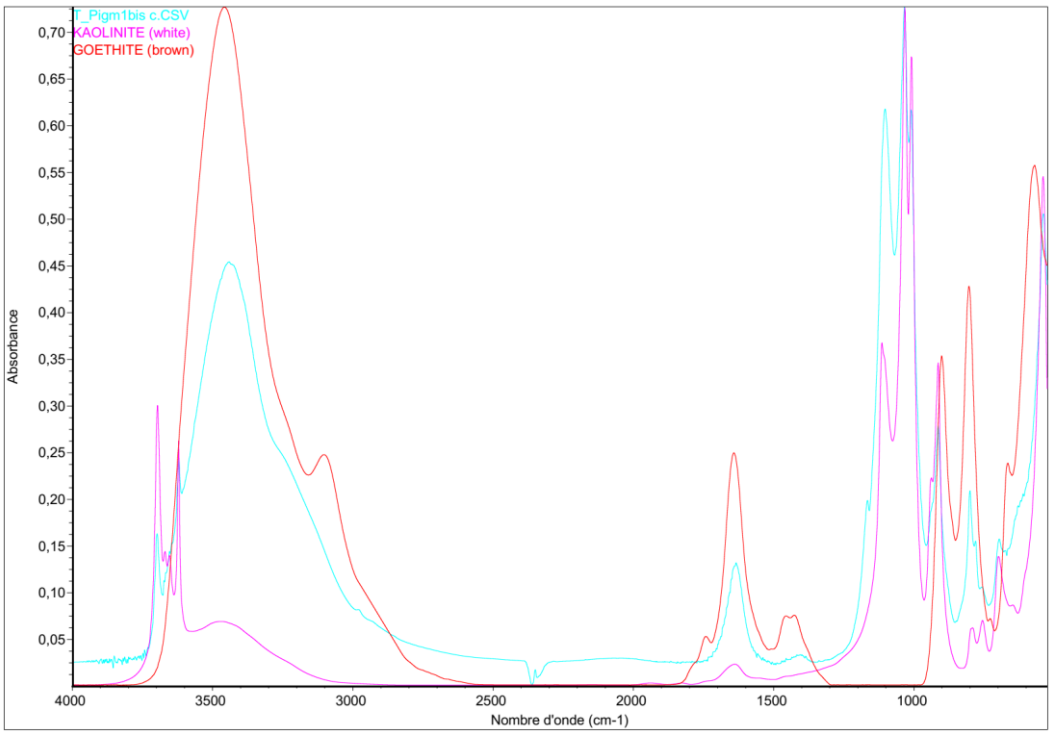


P45 XRD

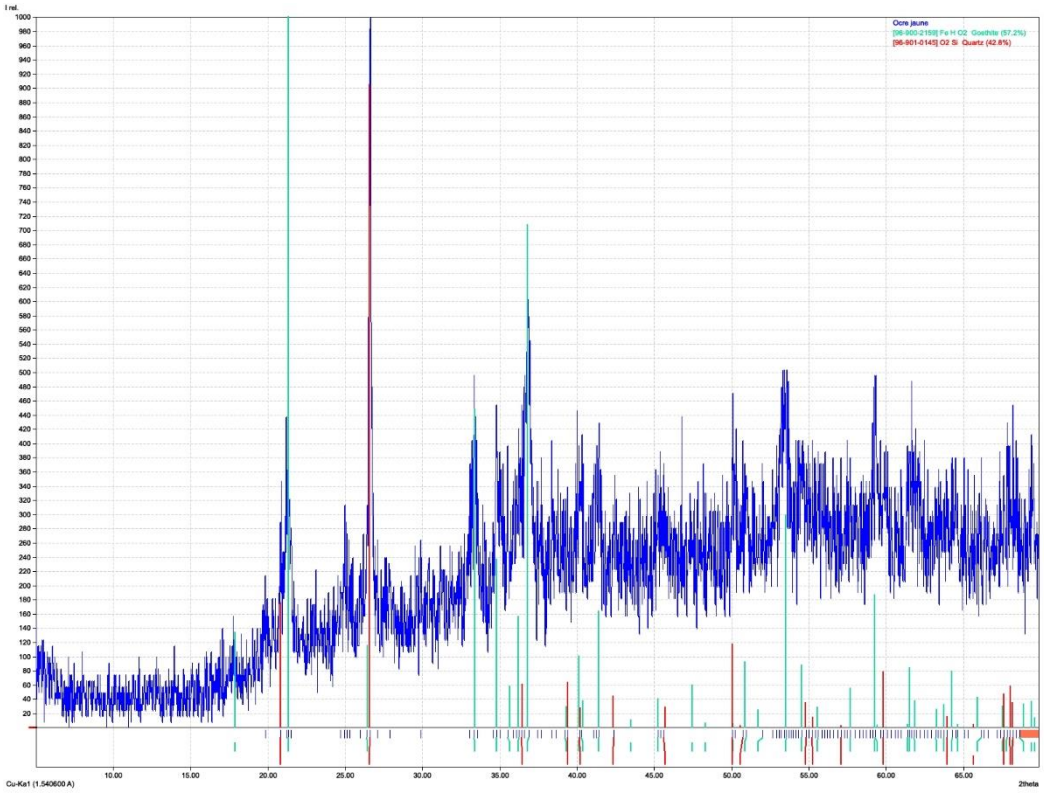
P1 Ocre jaune



Pigment n°1 #218 Ocre jaune XRF

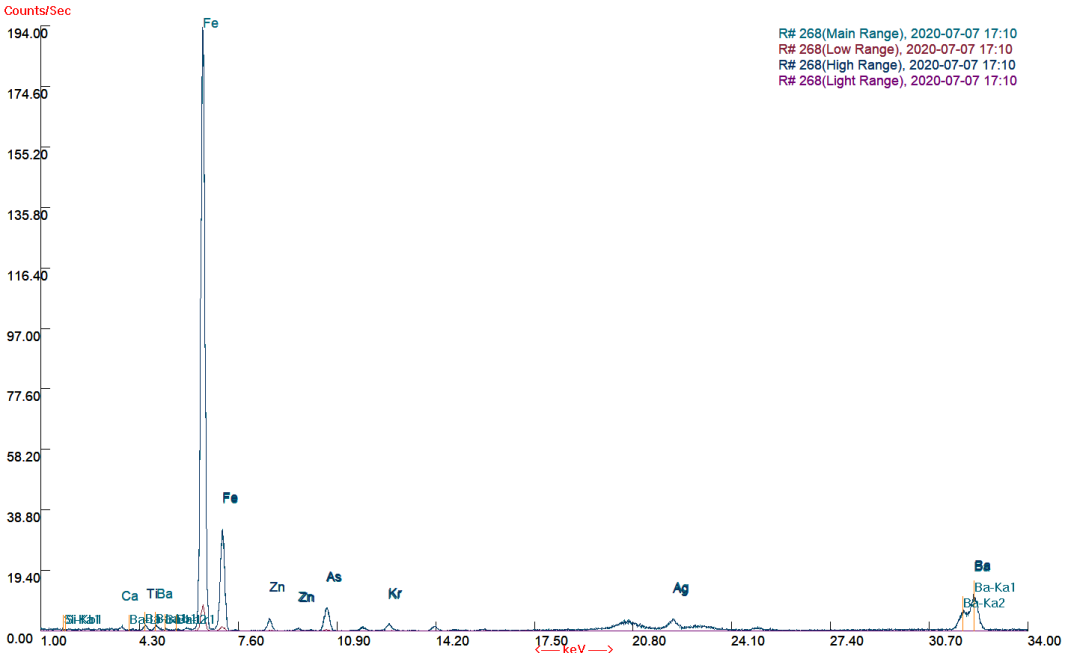


P1 FTIR Ocre jaune

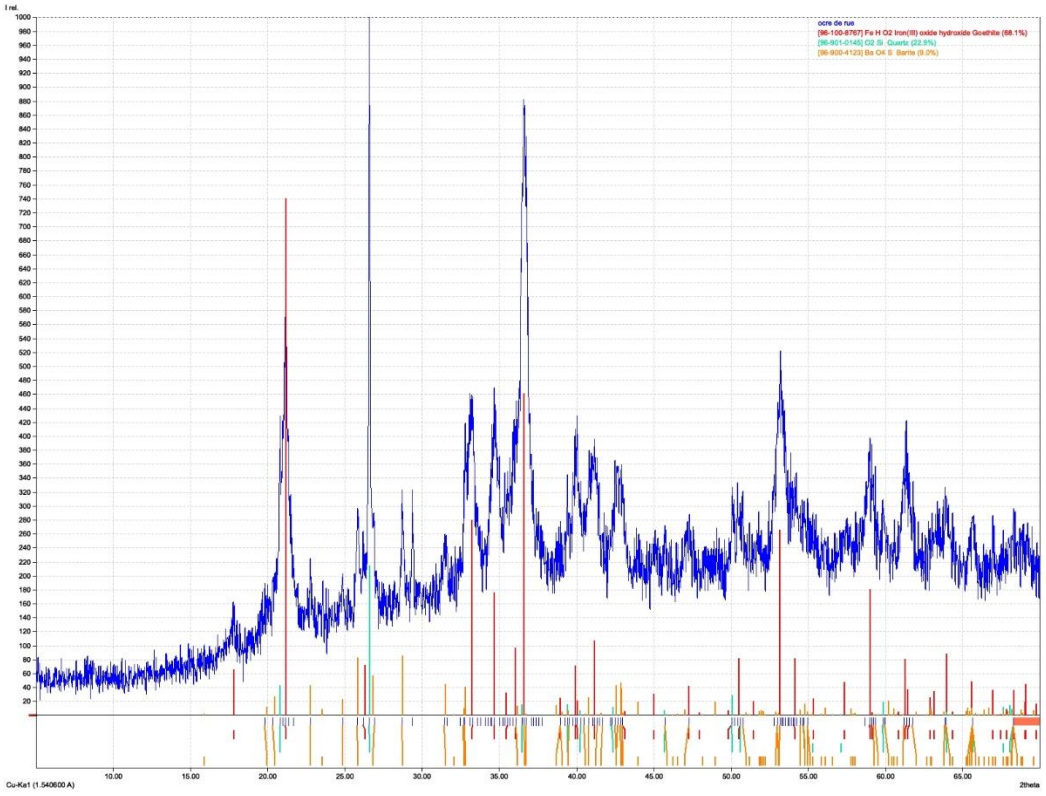


P1 XRD

P49 Ocre de Rue

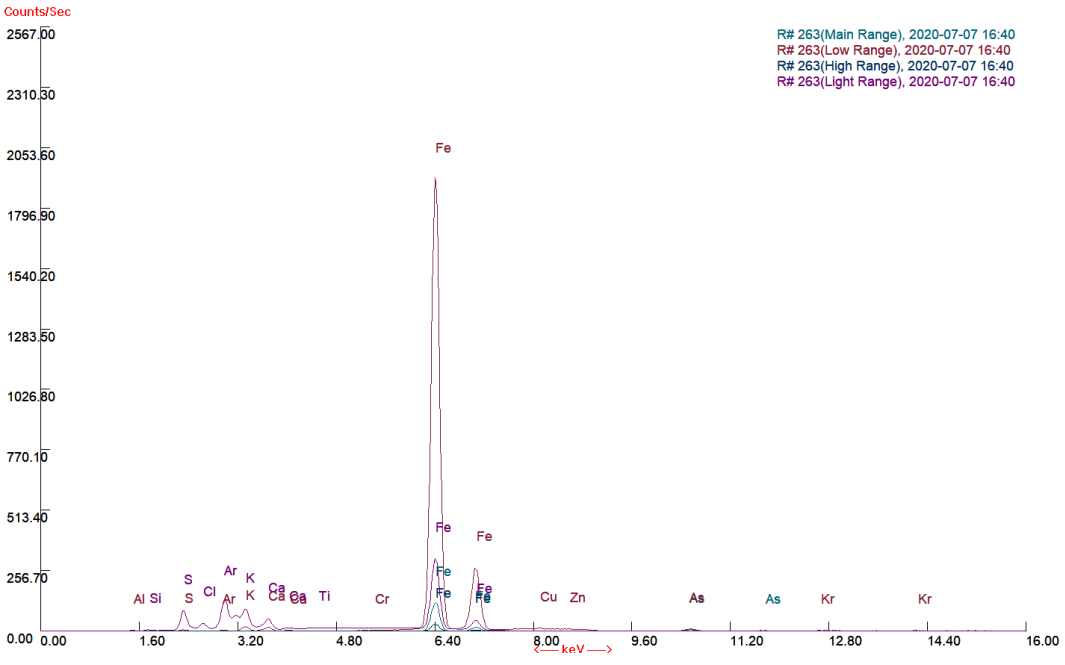


Pigment n°49 #268 Ocre de Rue XRF

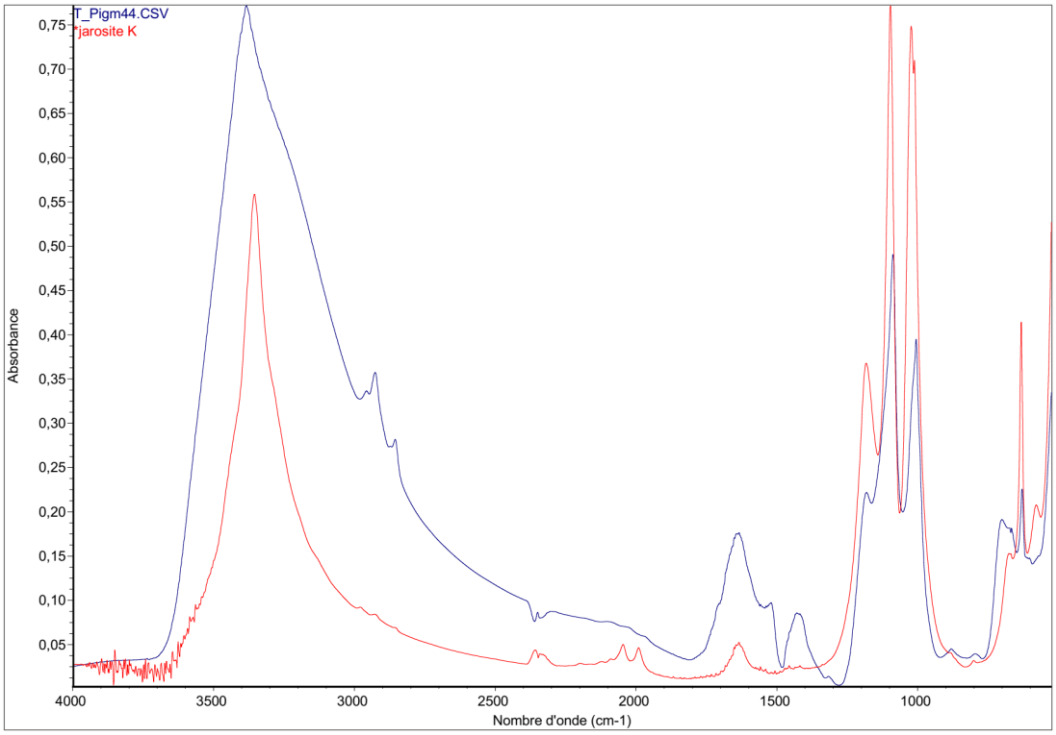


P49 XRD

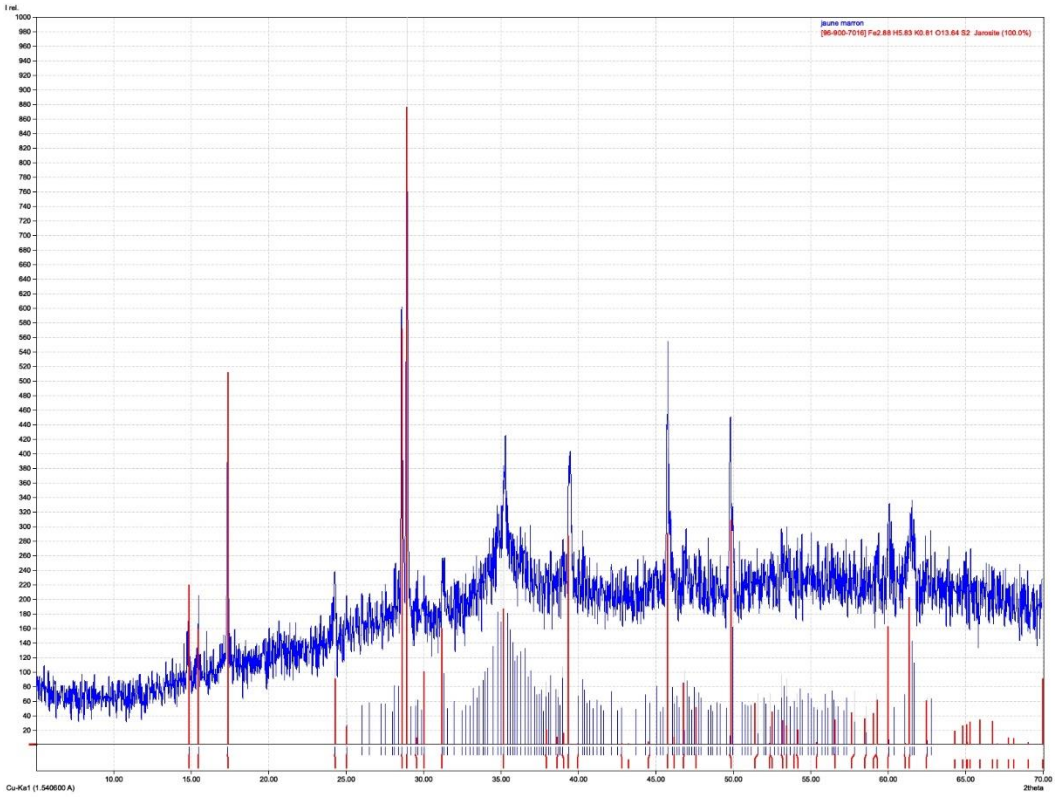
P44 Jaune Marron



Pigment n°44 #263 Jaune Marron XRF

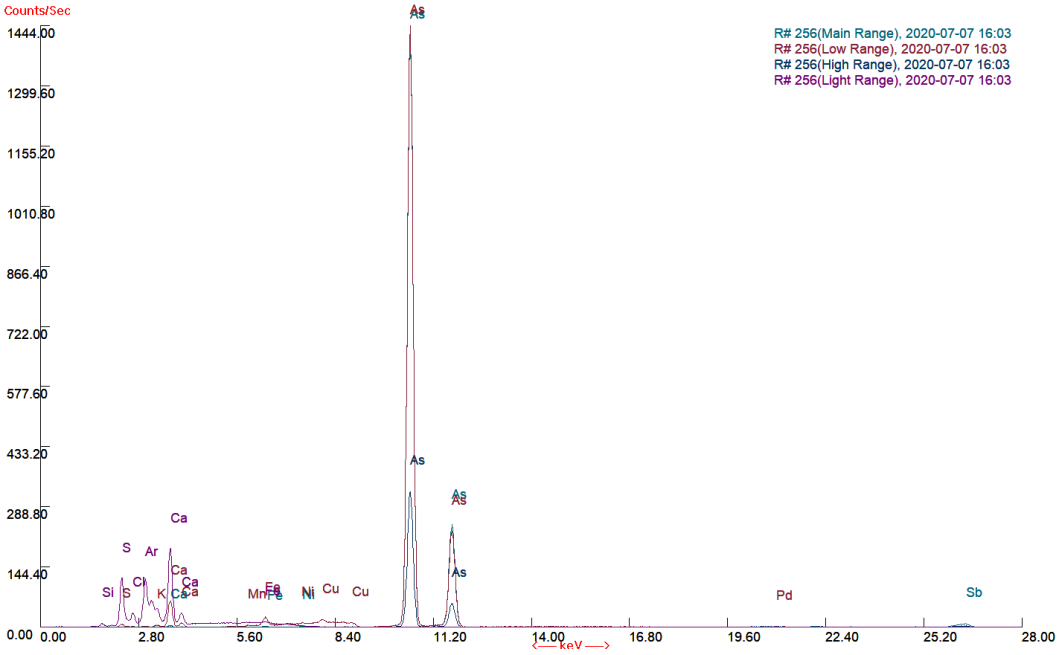


P44 FTIR

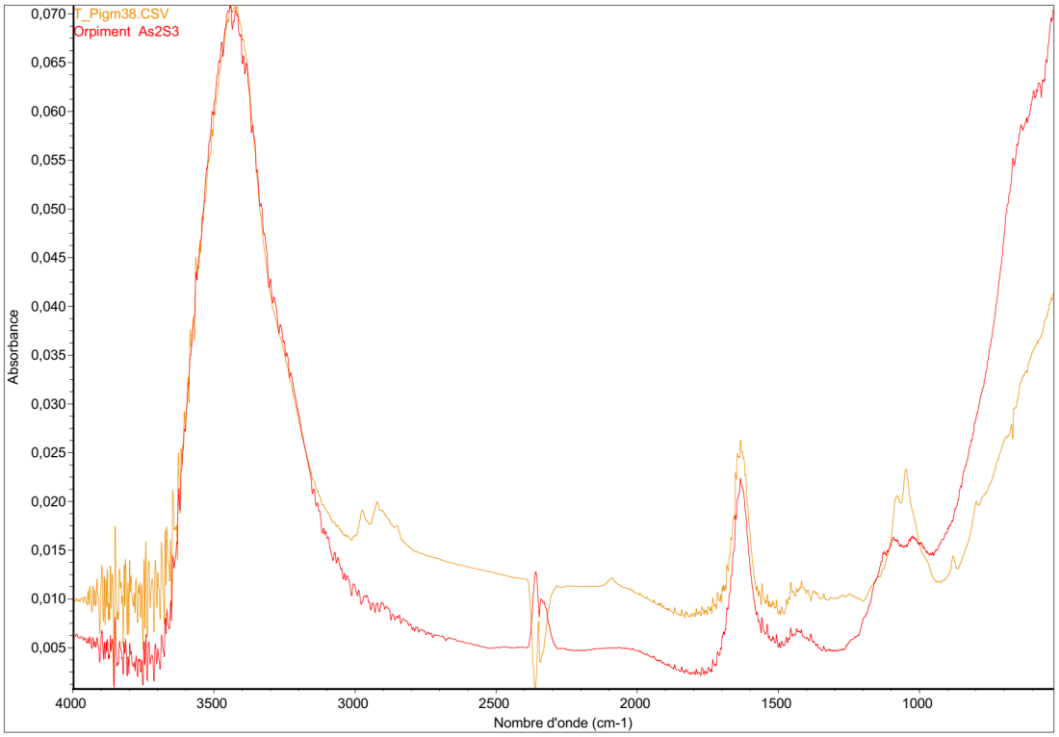


P44 XRD

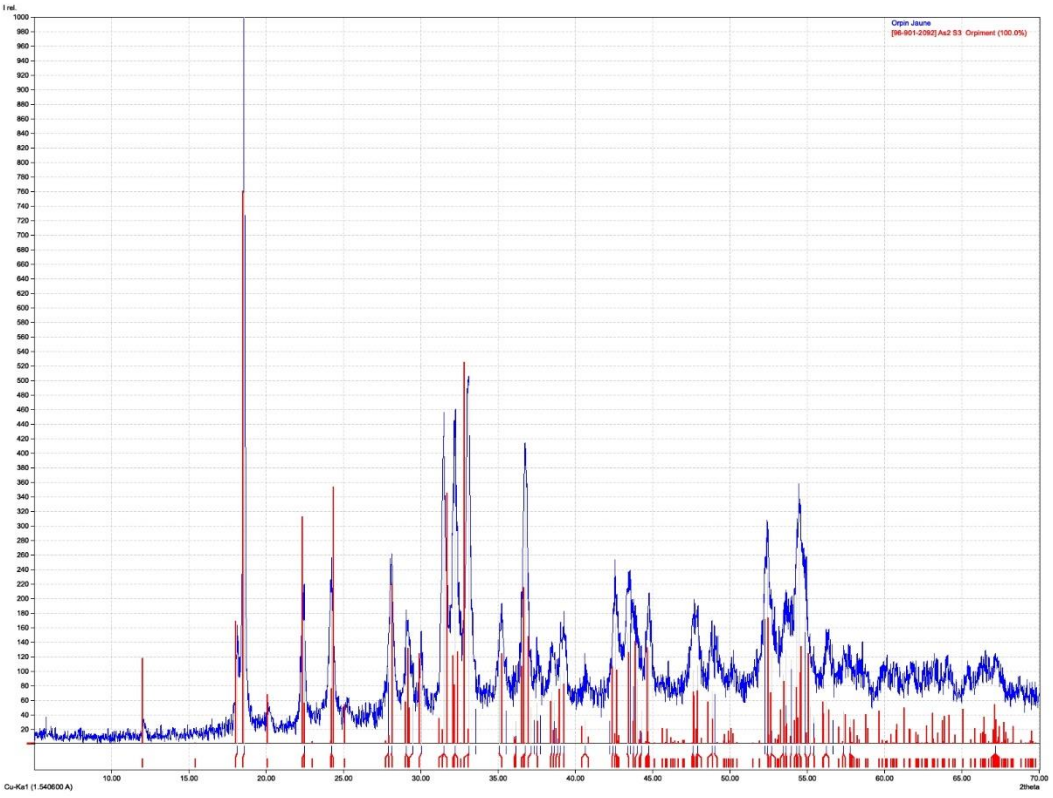
P38 Orpin jaune



Pigment n°38 #256 Orpin jaune XRF

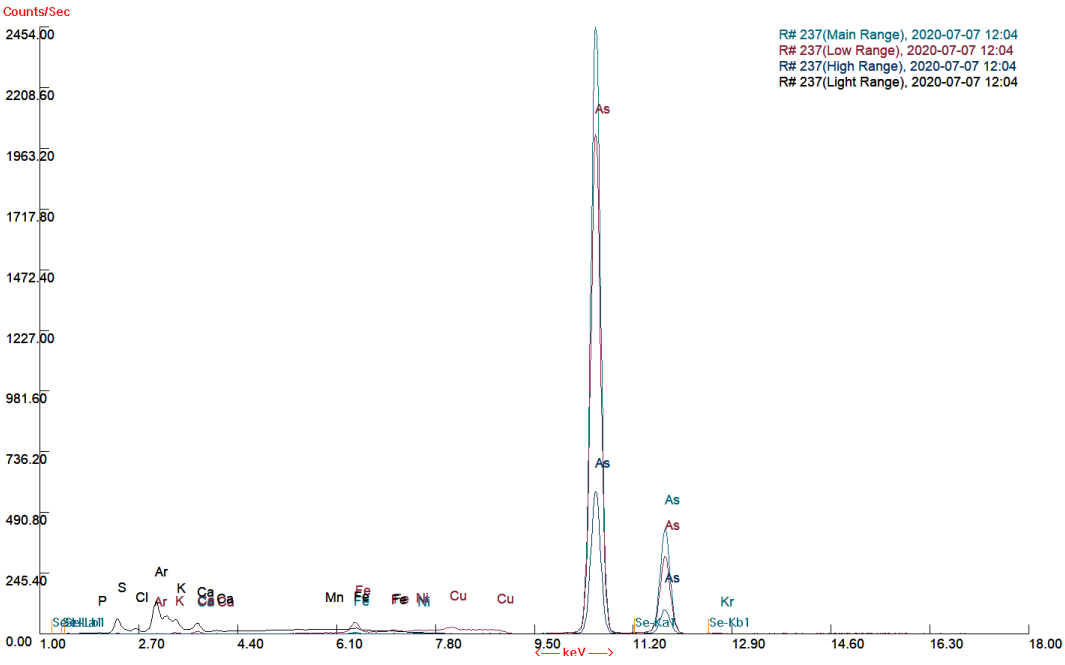


P38 FTIR

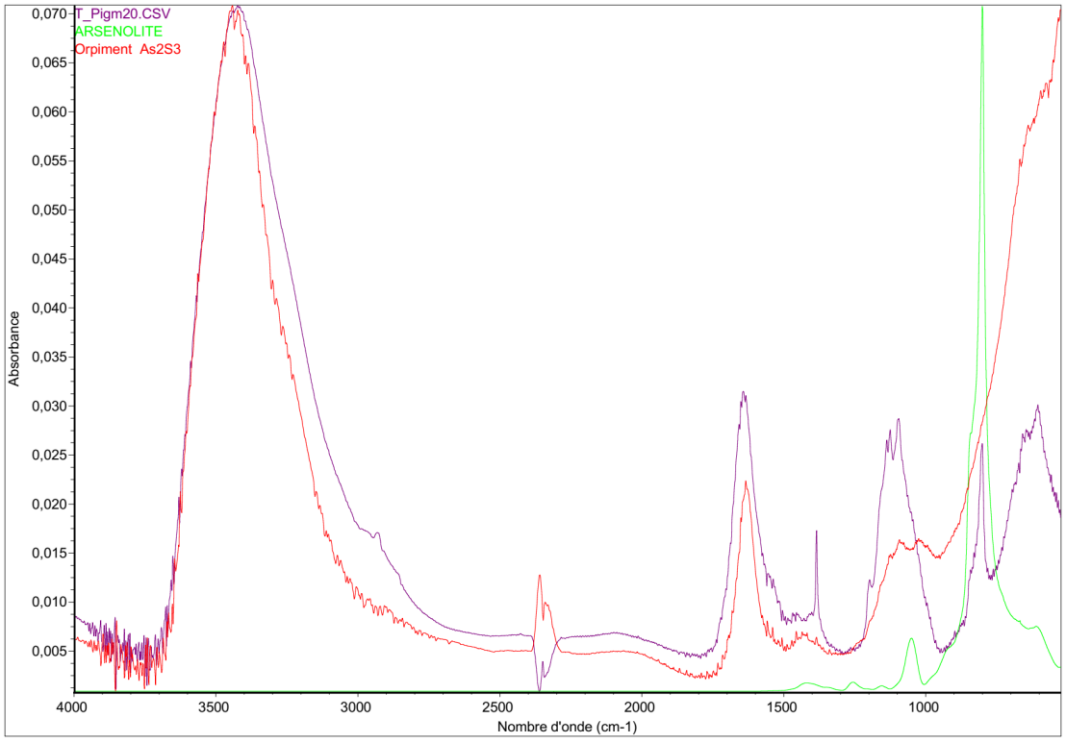


P38 XRD

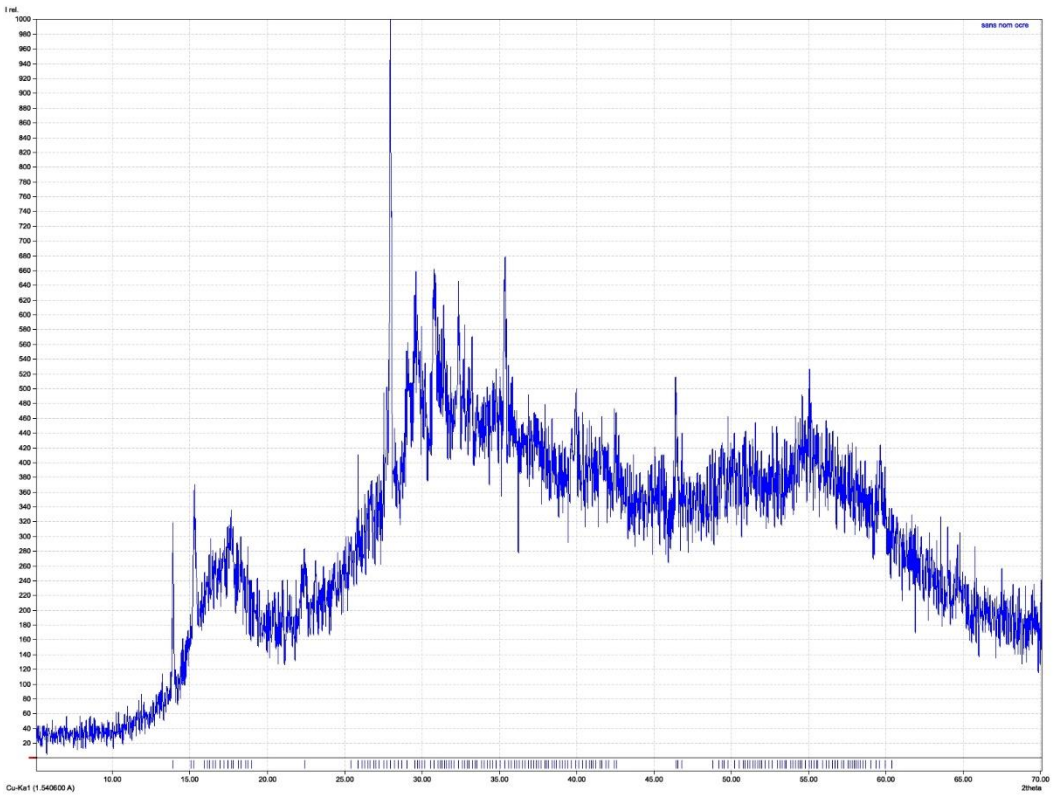
P20 Sans nom Ocre



Pigment n°20 #237 Sans nom Ocre XRF

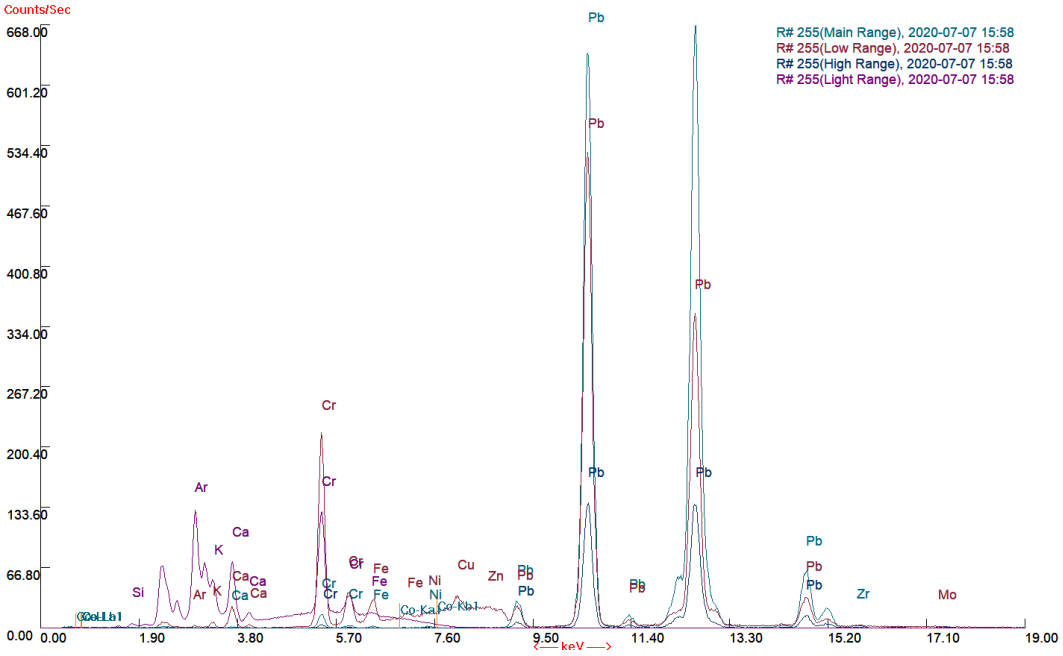


P20 FTIR

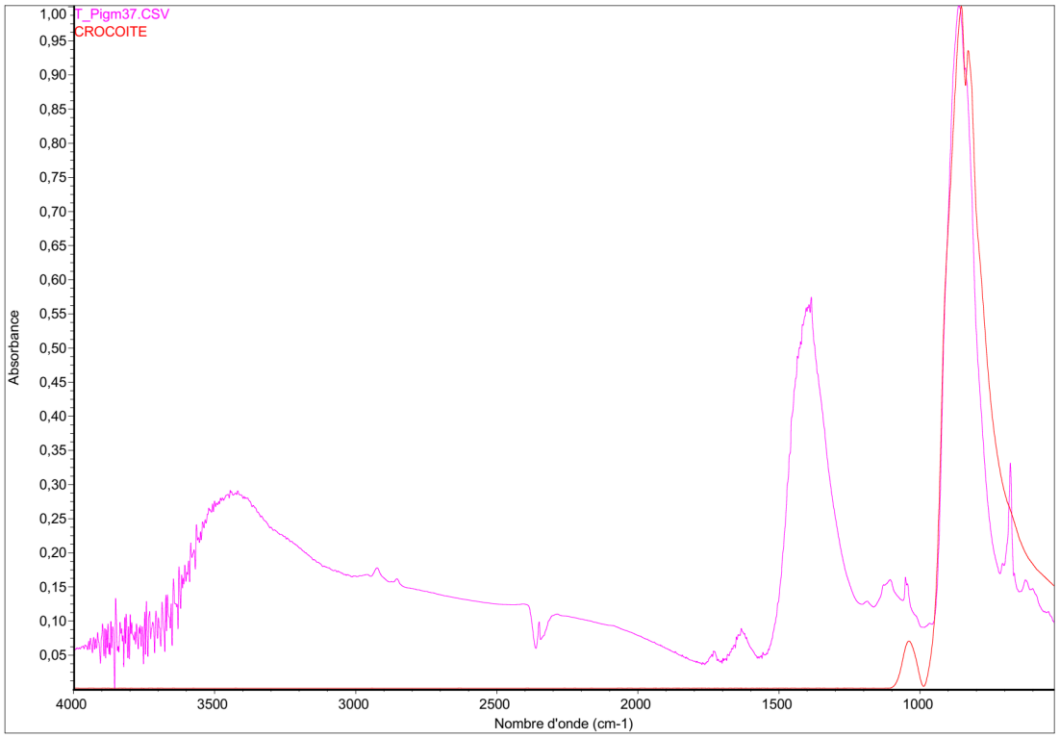


P20 XRD

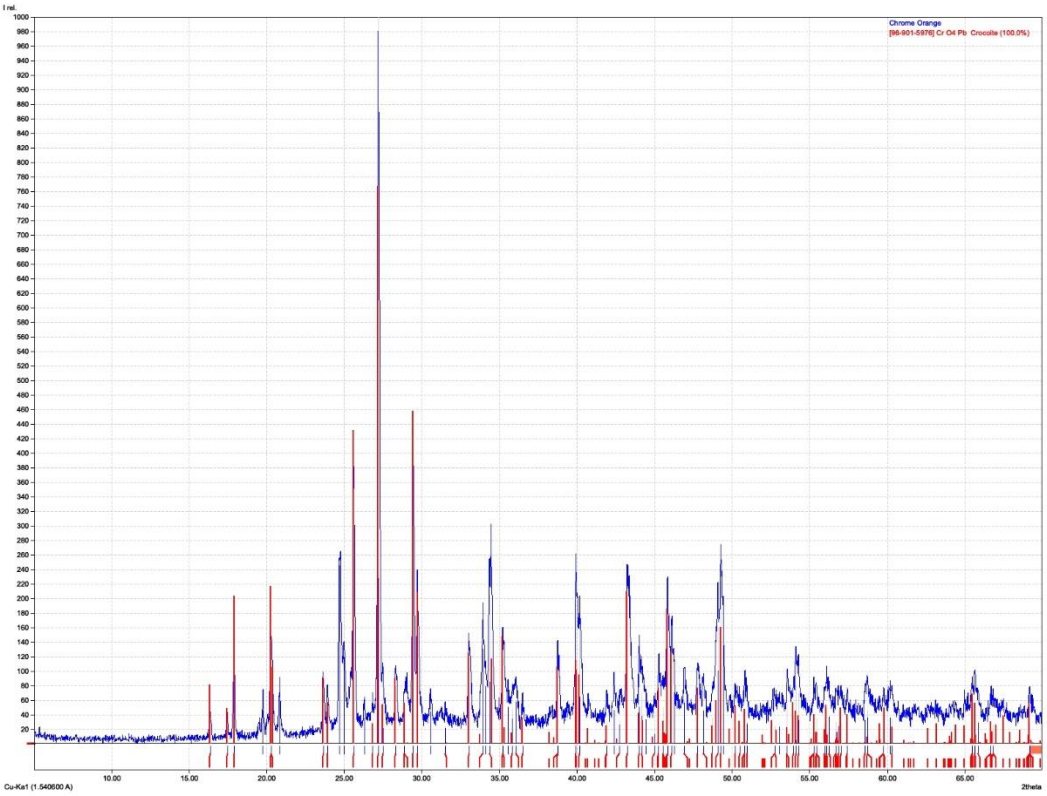
P37 Chrome orange



Pigment n°37 #255 Chrome orange XRF

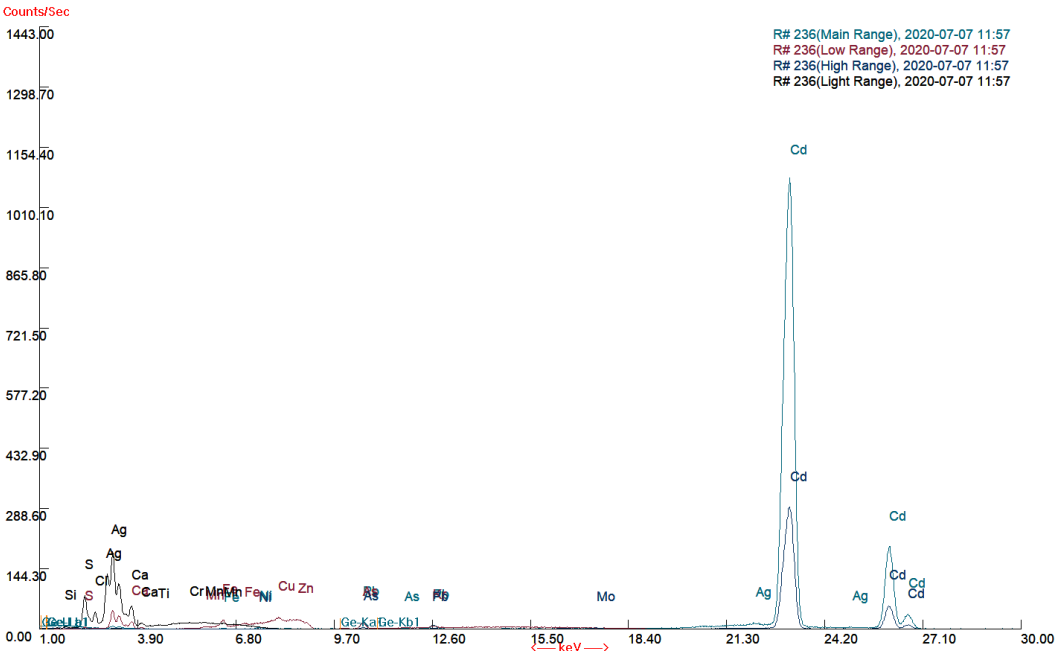


P37 FTIR

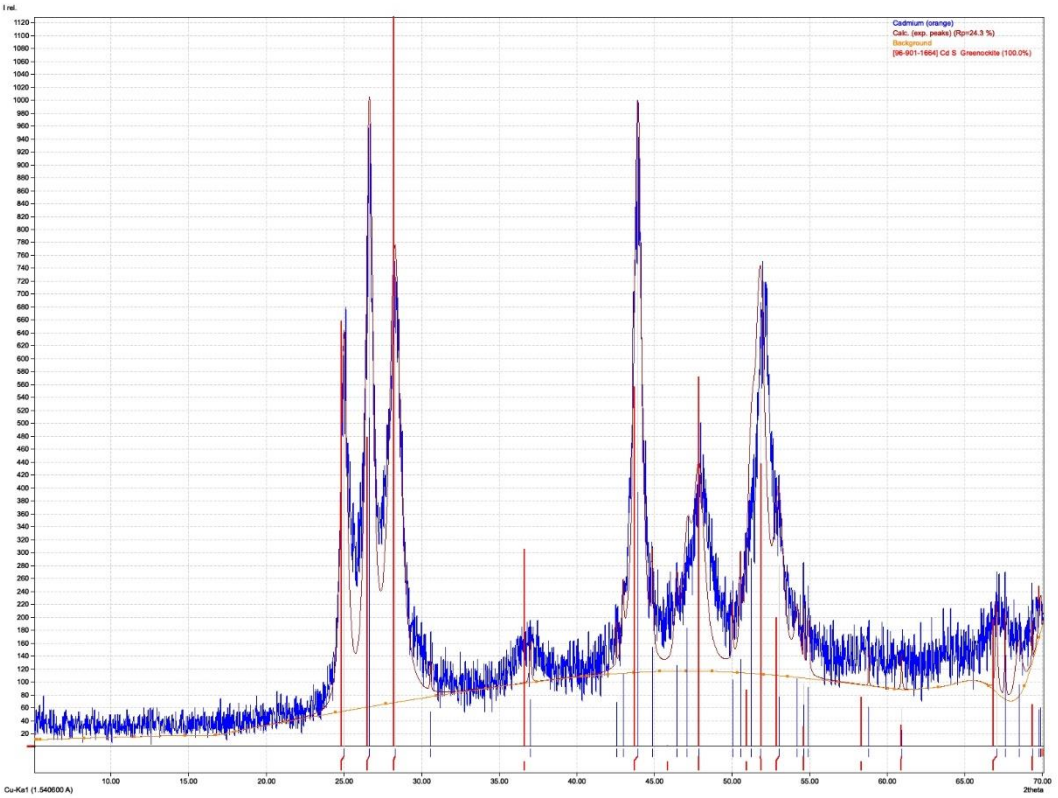


P37 XRD

P19 Cadmium (orange)

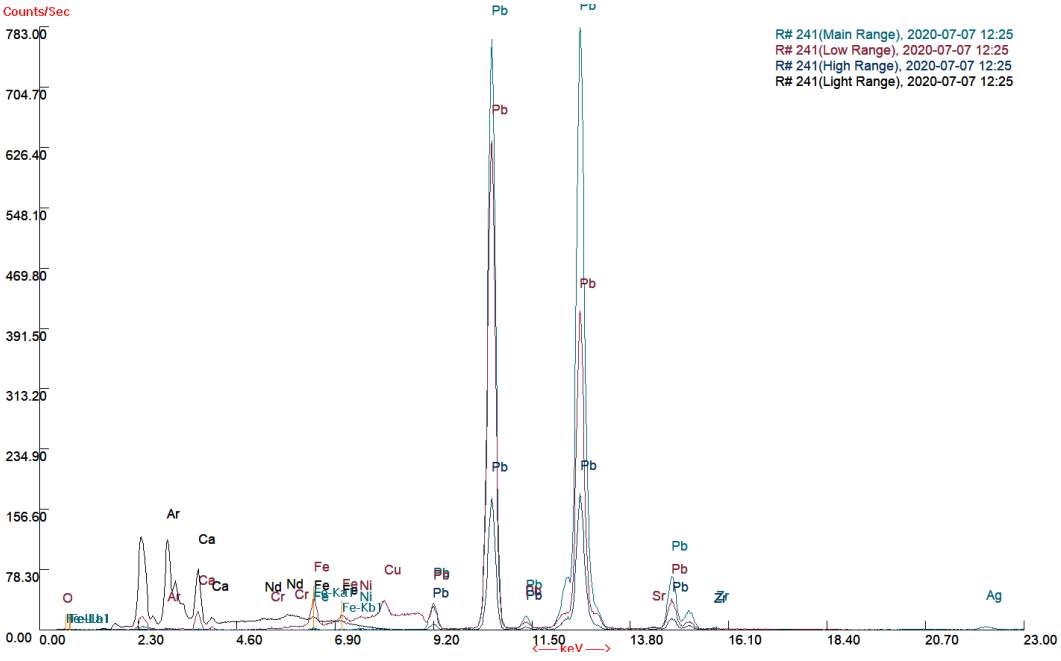


Pigment n°19 #236 Cadmium (orange) XRF

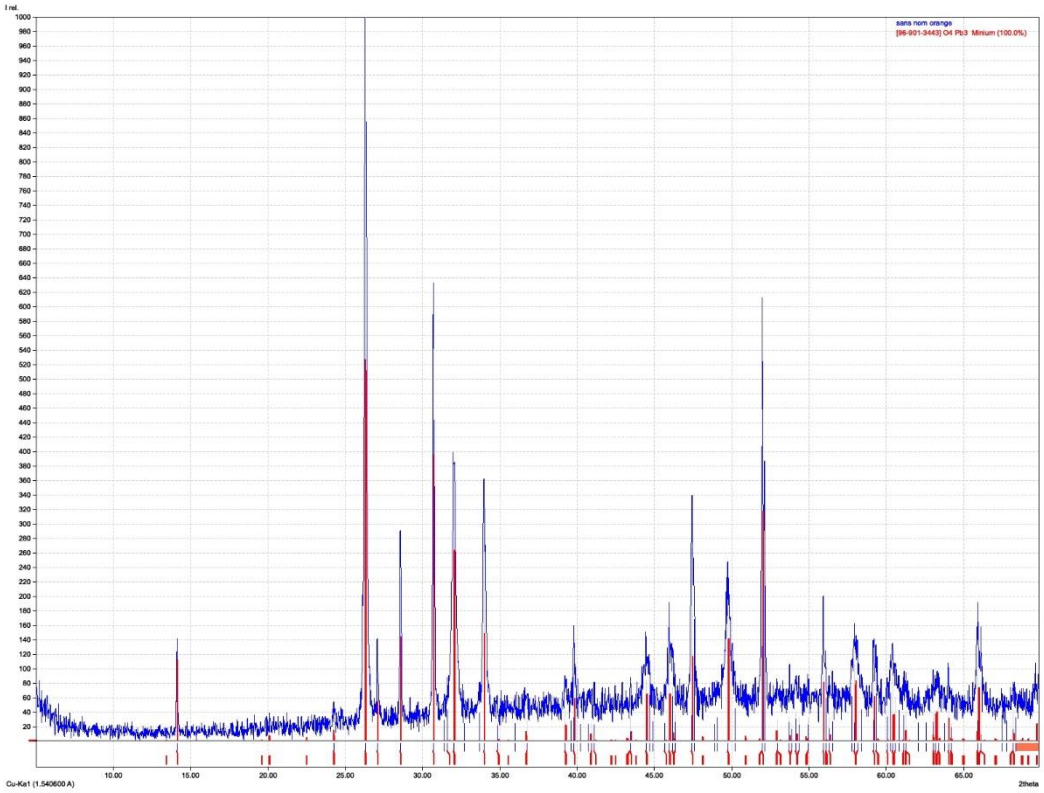


P19 XRD

P24 Sans nom Orange

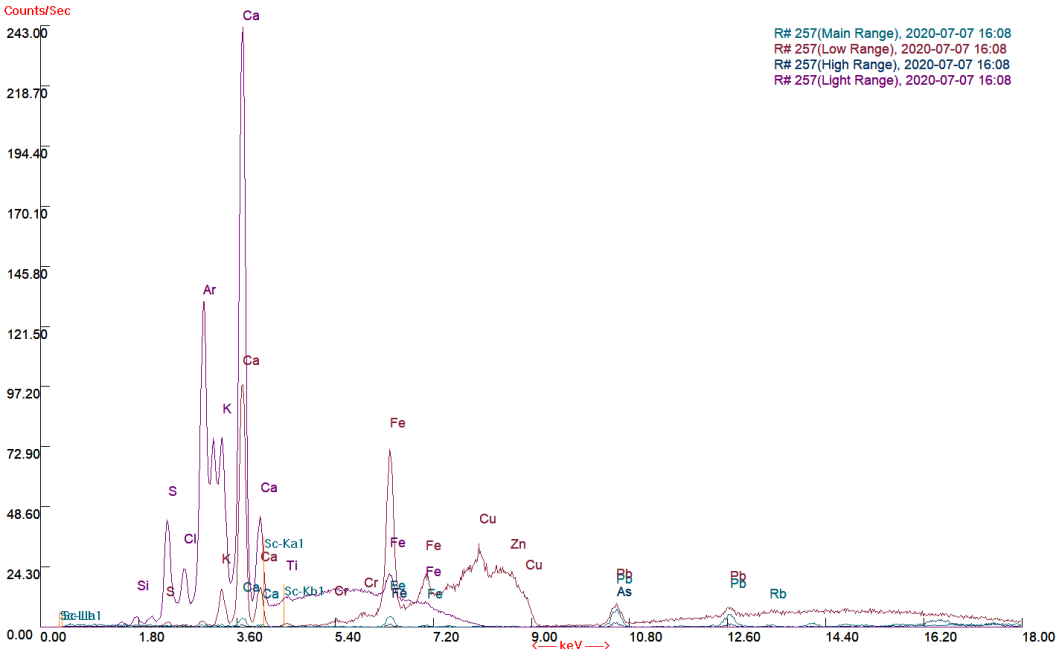


Pigment n°24 #241 Sans nom Orange XRF

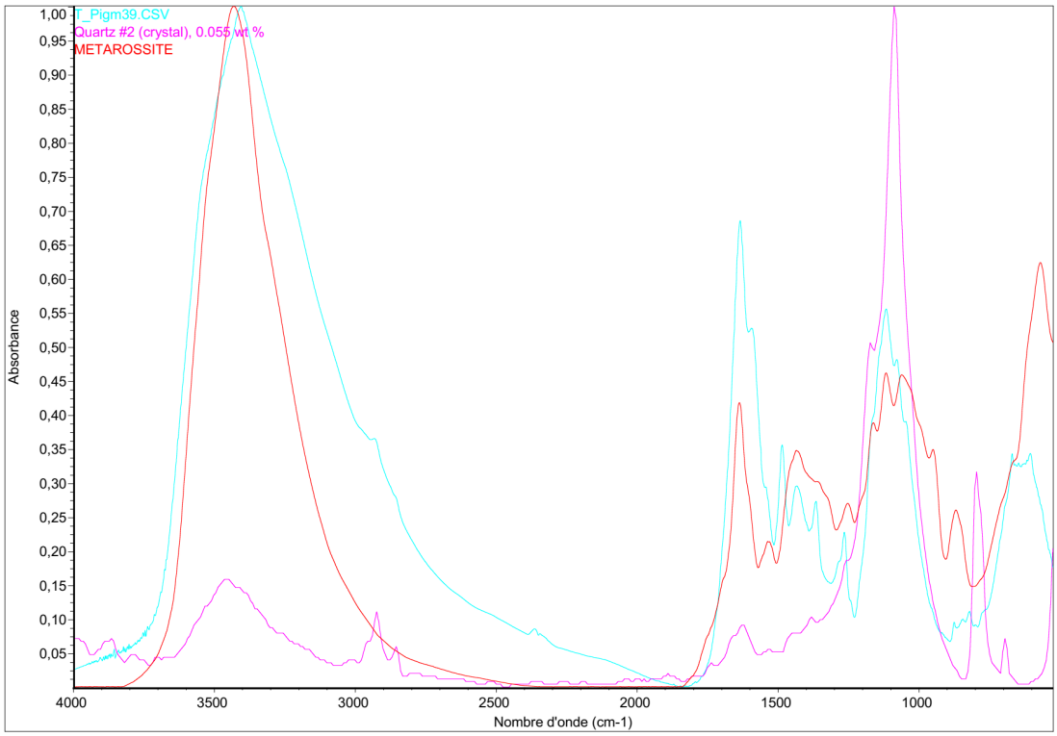


P24 XRD

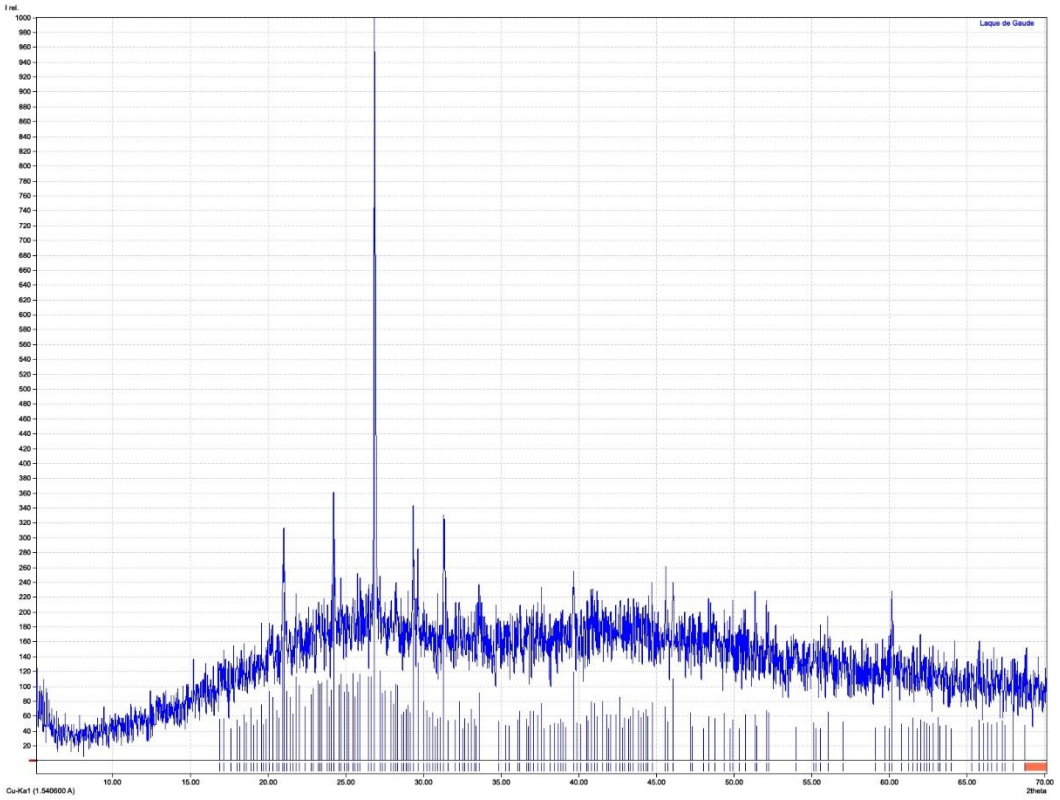
P39 Laque de Gaude



Pigment n°39 #257 Laque de Gaude XRF

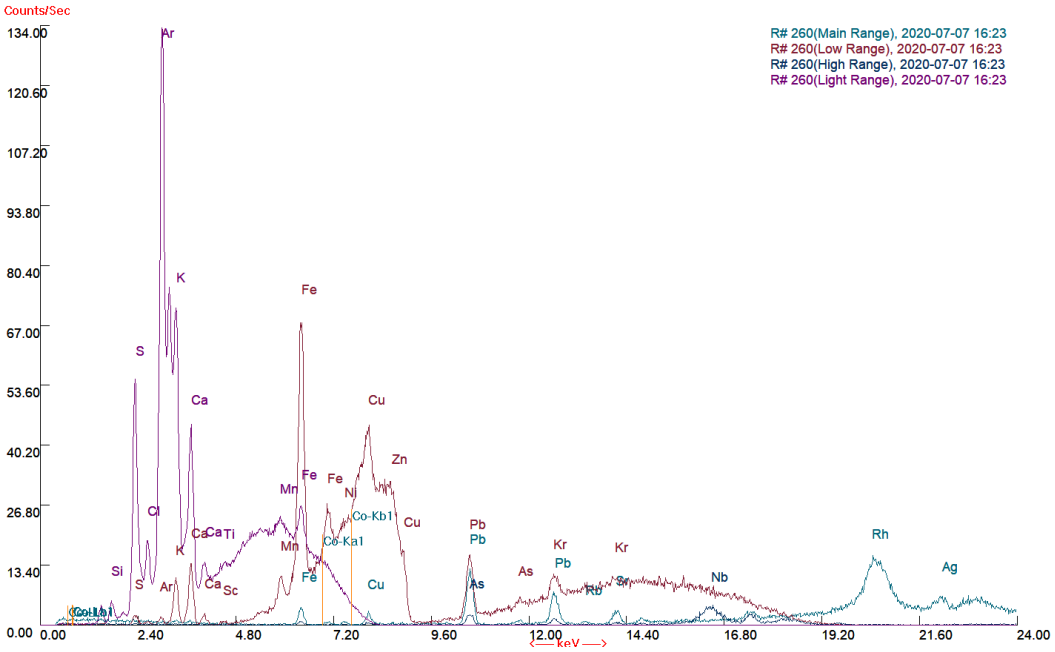


P39 FTIR

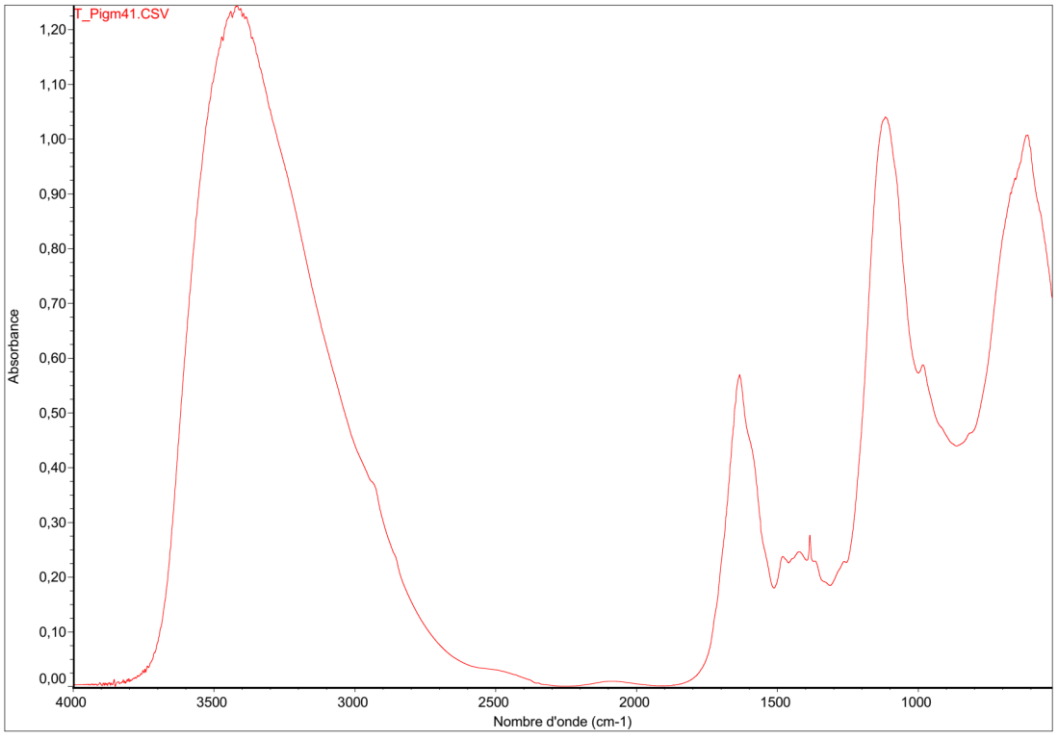


P39 XRD

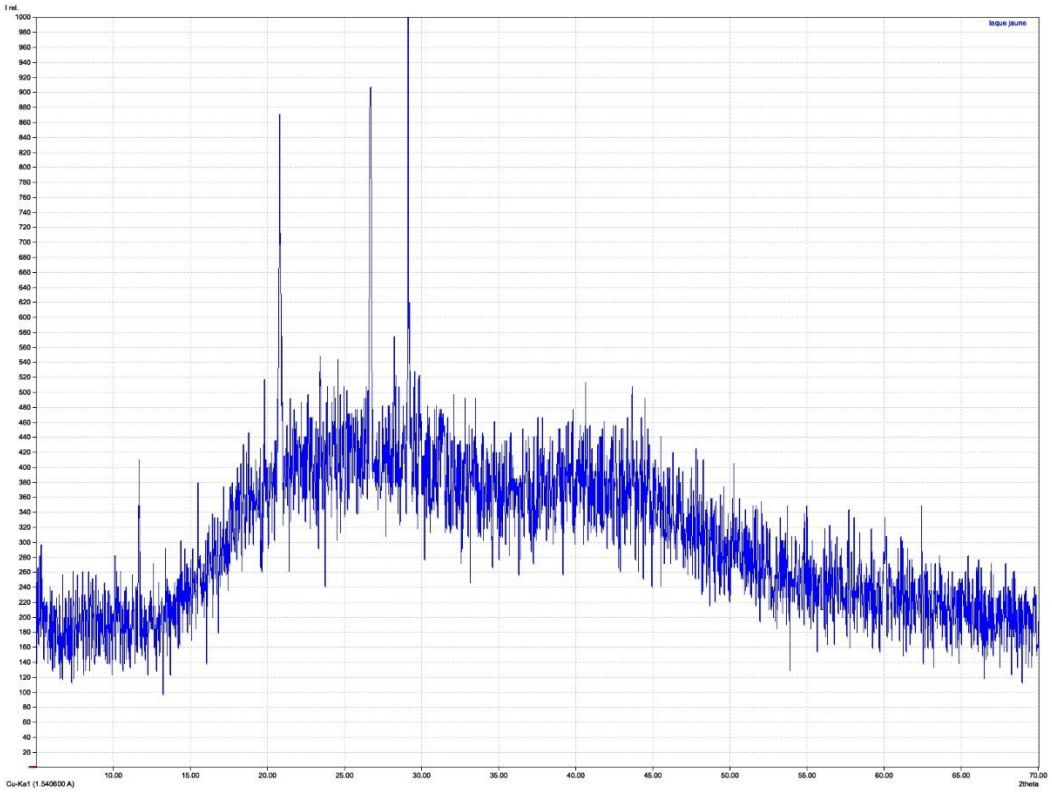
P41 Laque Jaune



Pigment n°41 #260 Laque Jaune XRF

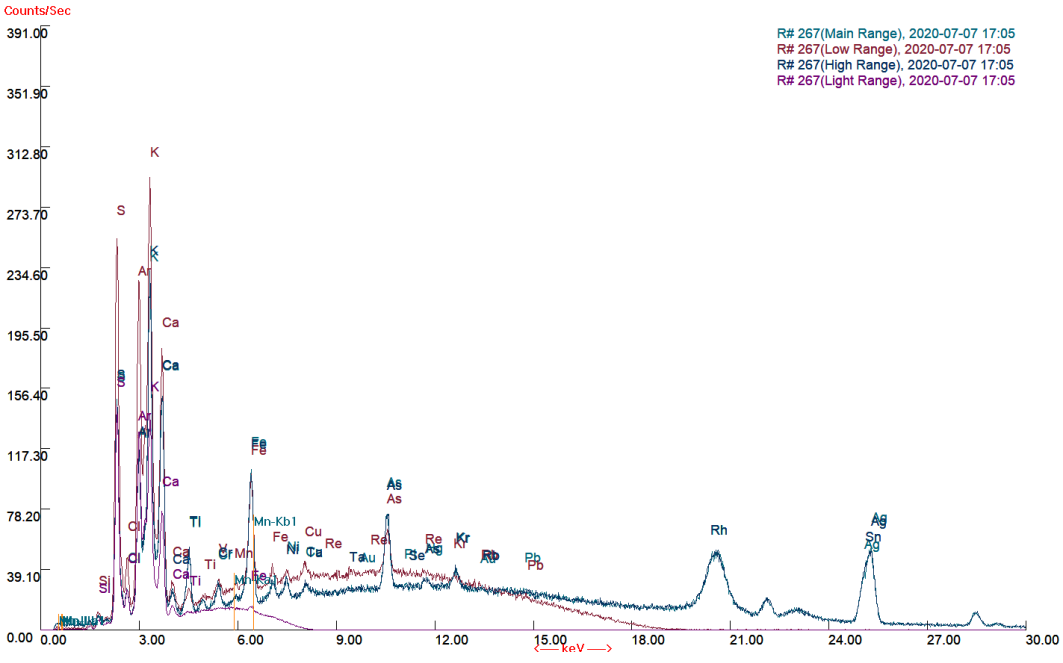


P41 FTIR

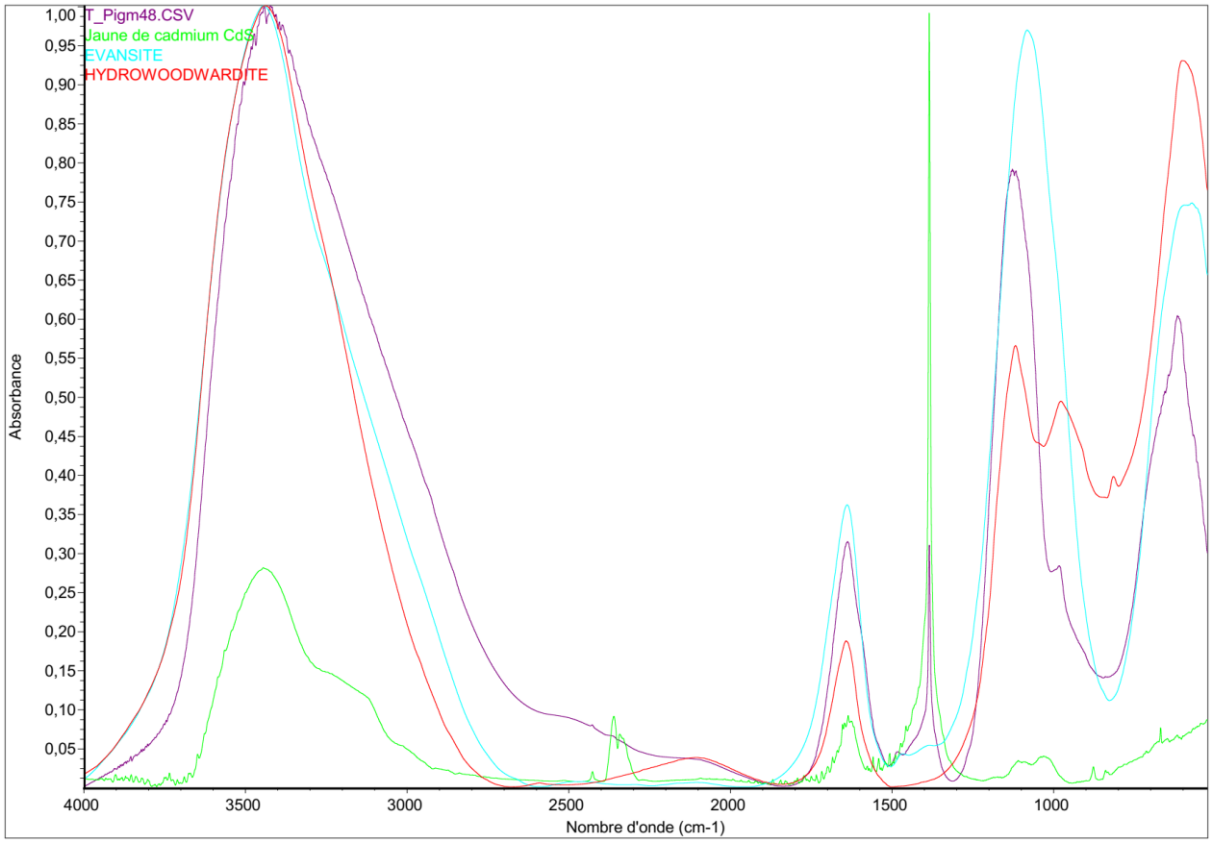


P41 XRD

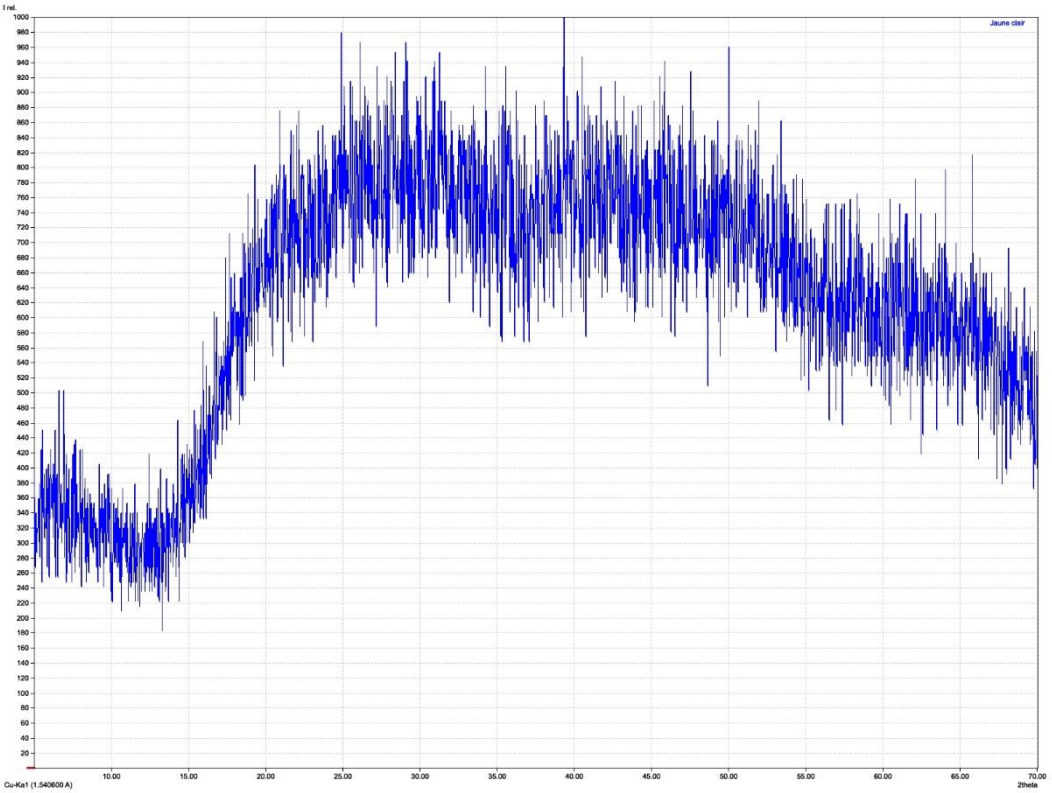
P48 Jaune clair



Pigment n°48 #267 Jaune clair XRF



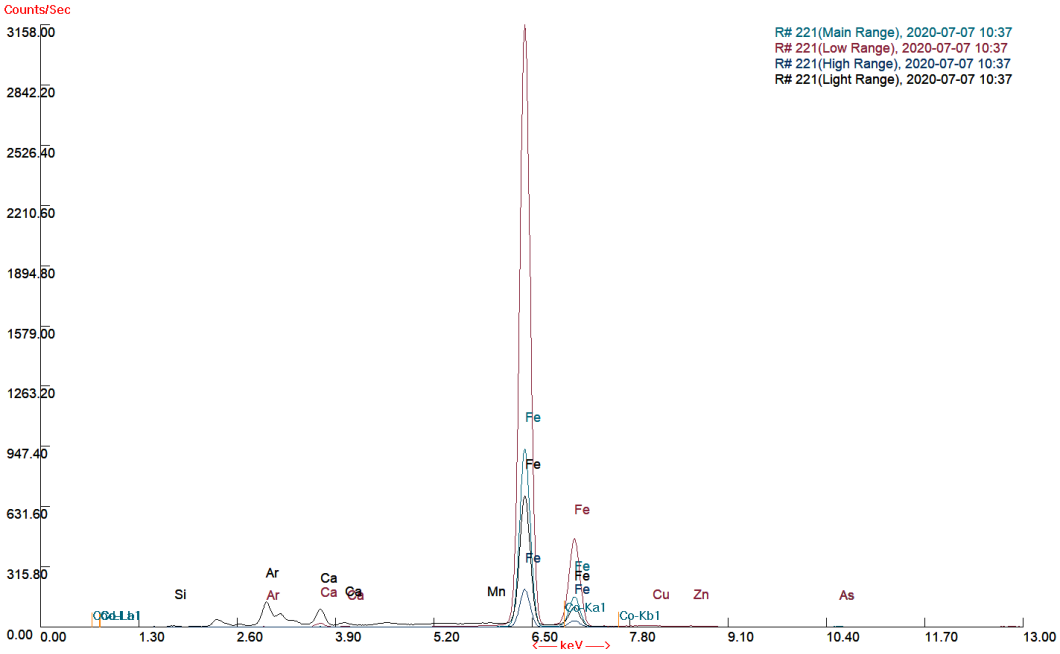
P48 FTIR



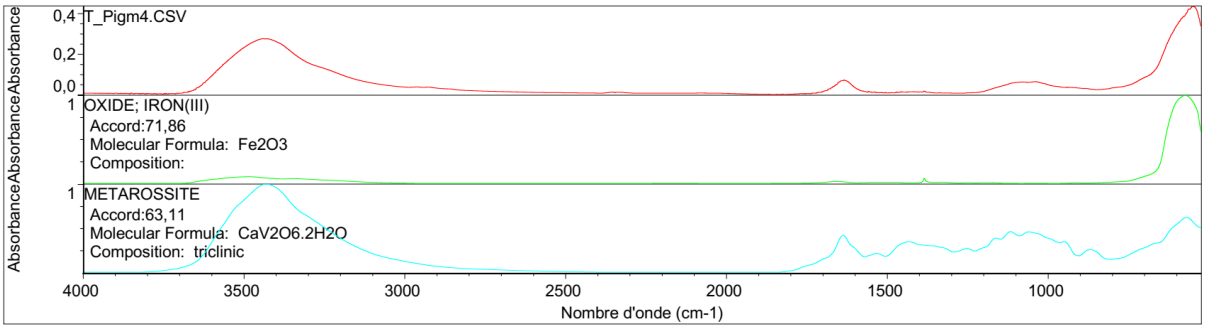
P48 XRD

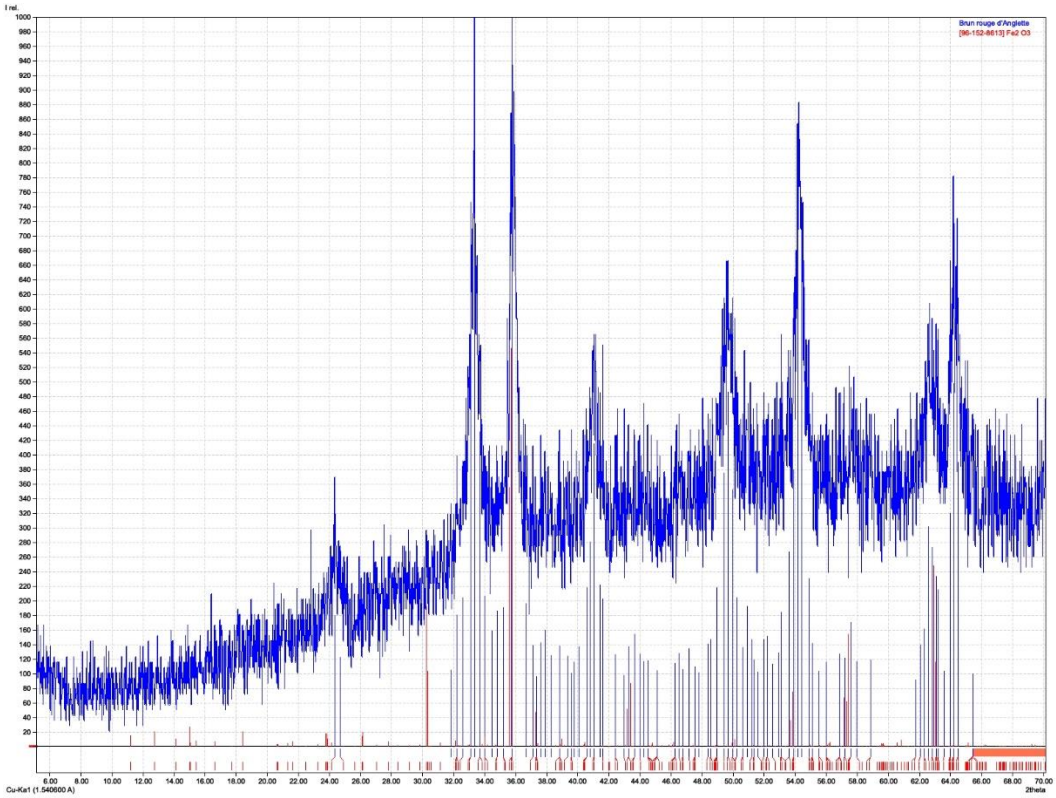
Table 2

P4 Brun Rouge d'Angleterre



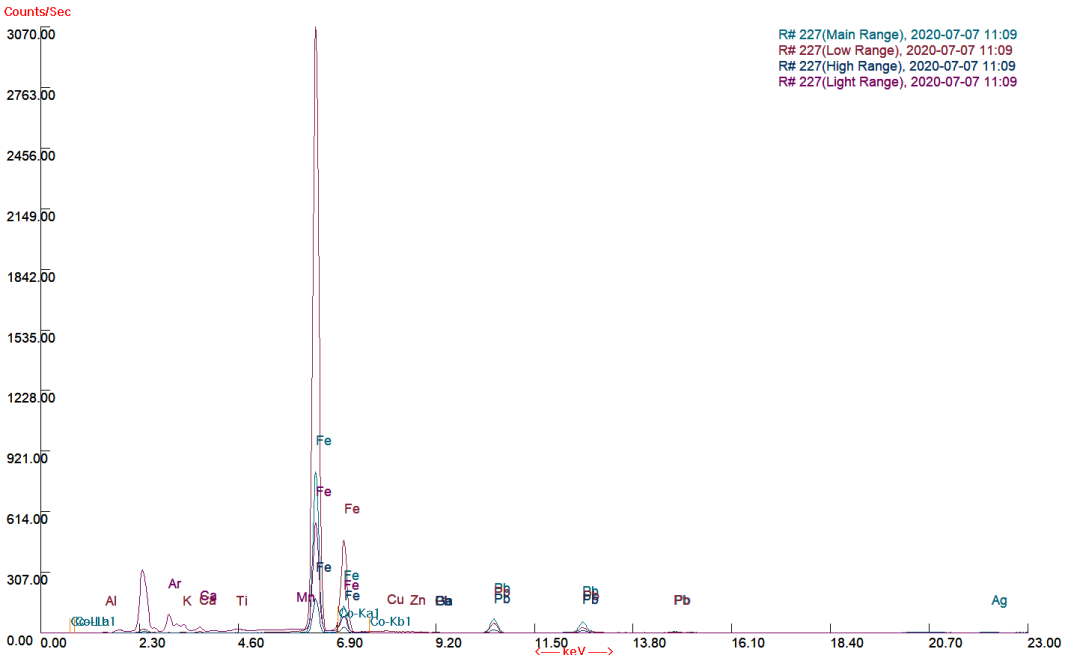
Pigment n°4 #221 Brun Rouge d'angletterre XRF



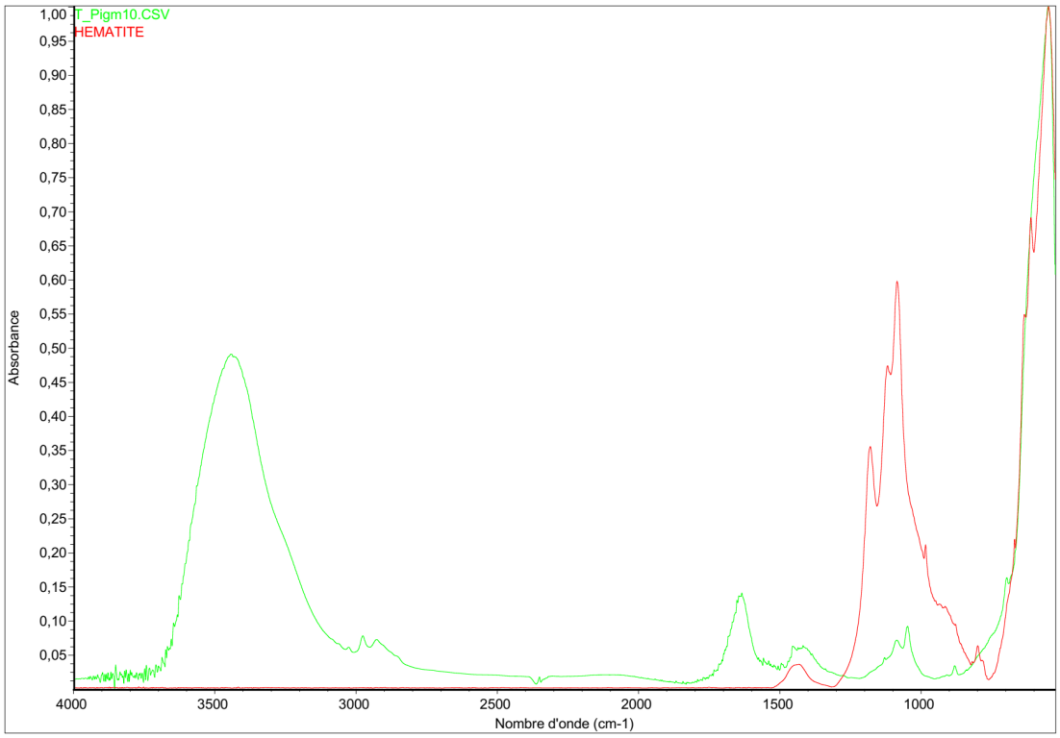


P4 XRD

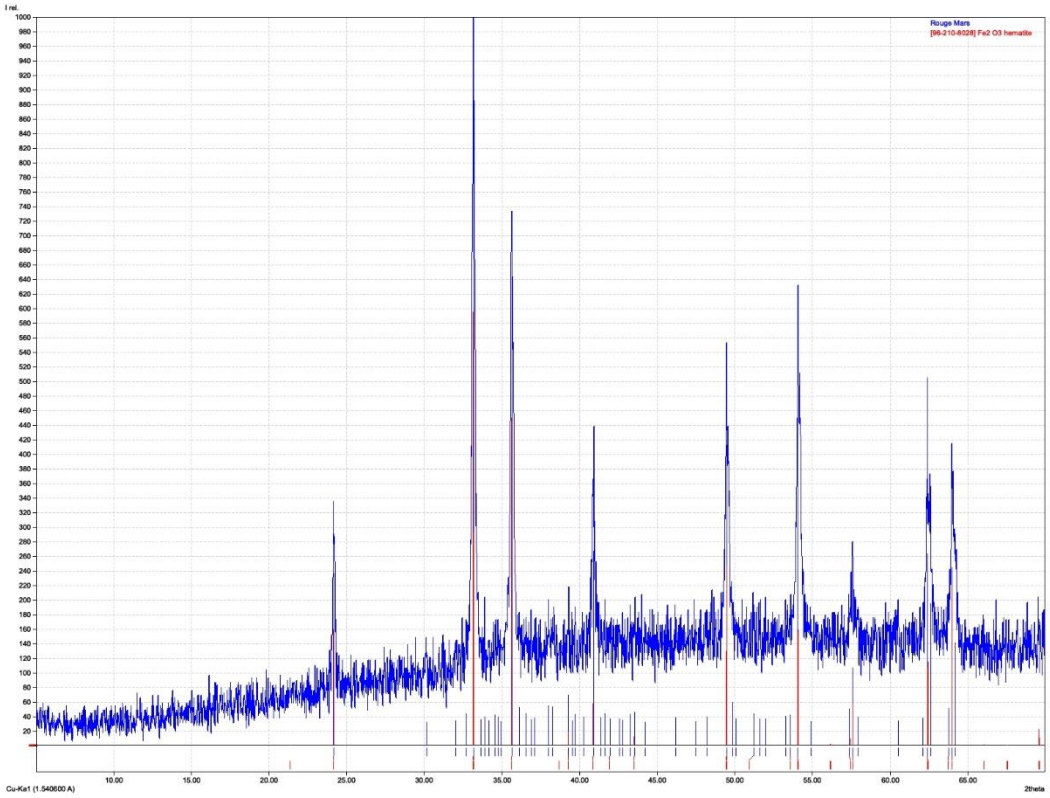
P10 Rouge Mars



Pigment n°10 #227 Rouge Mars XRF

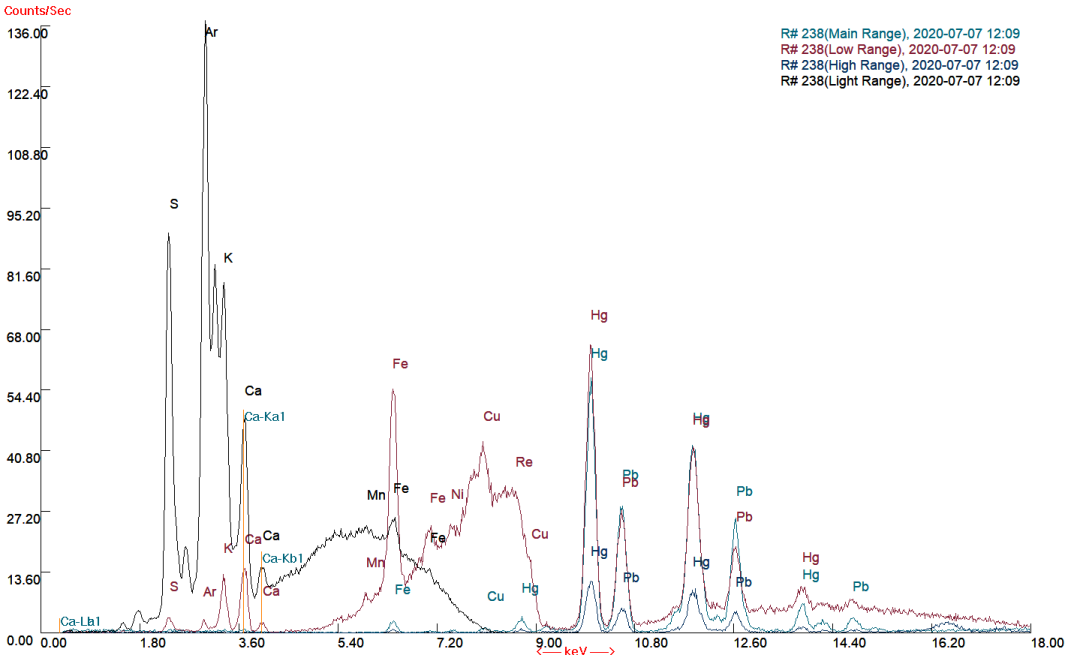


P10 FTIR

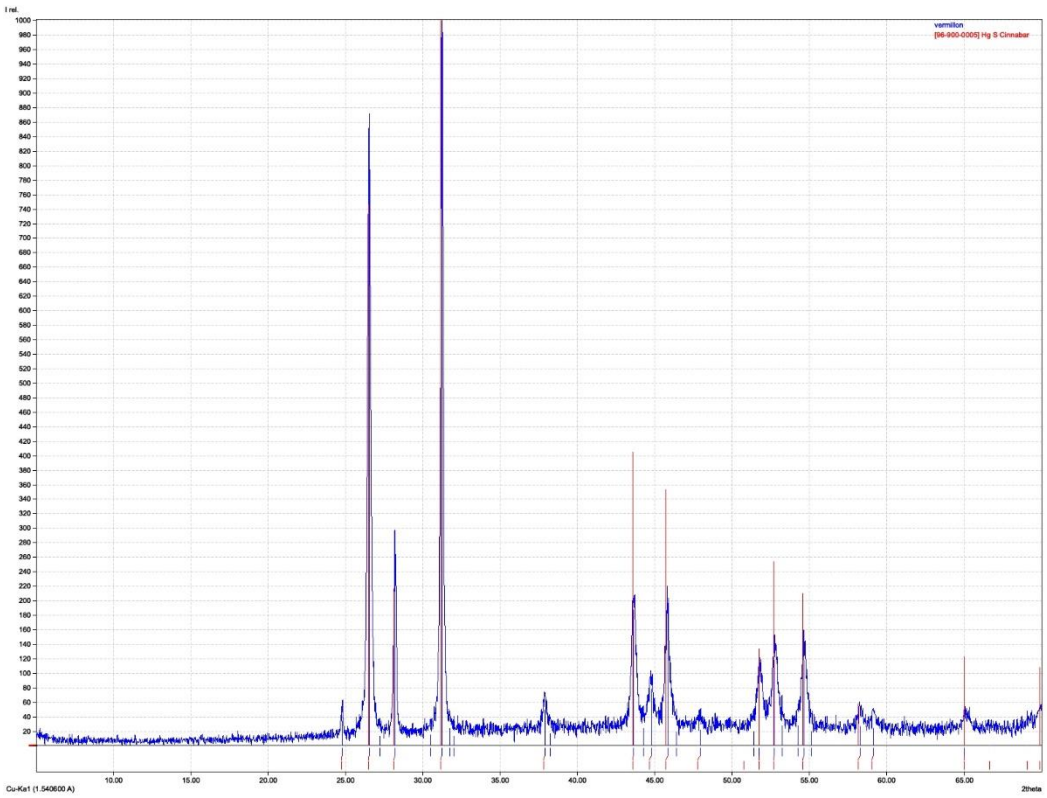


P10 XRD

P21 Vermillon

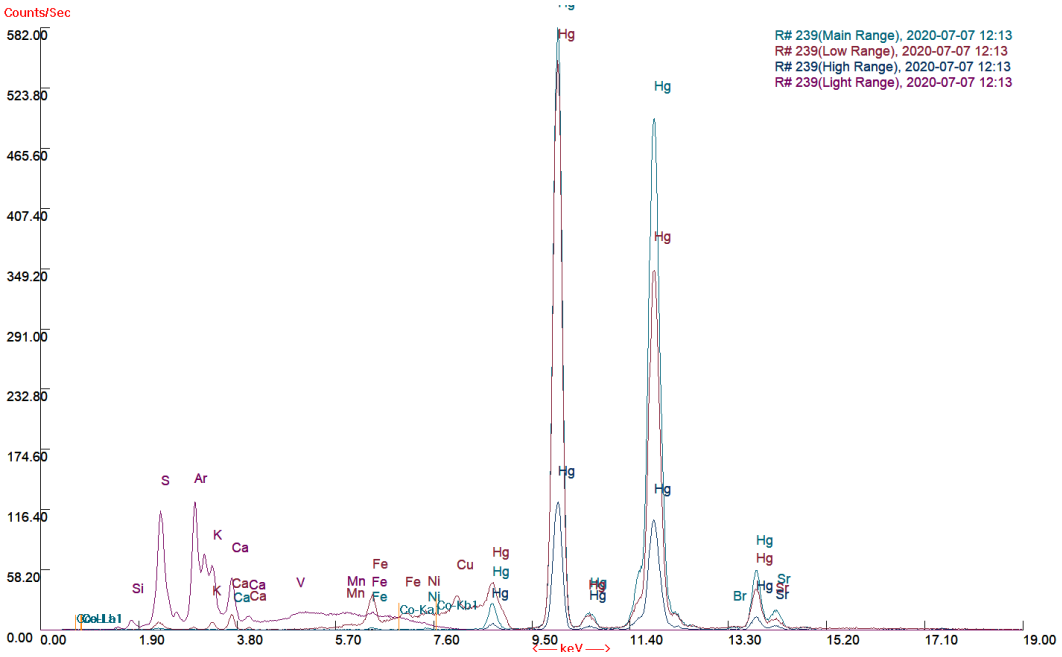


Pigment n°21 #238 Vermillon XRF



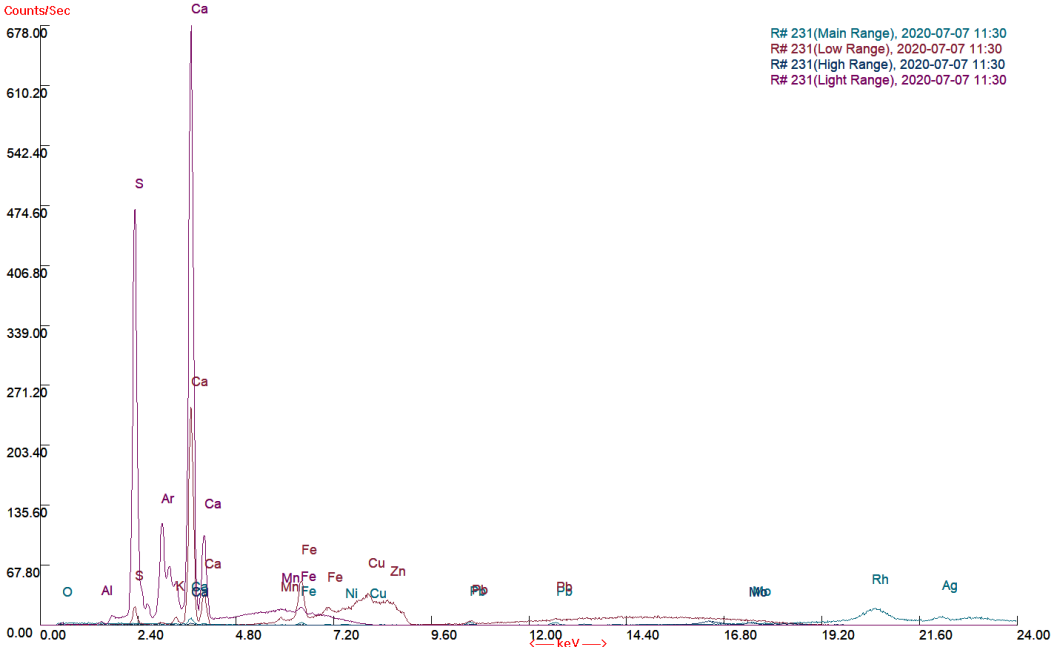
P21 XRD

P22 Vermillon de Chine

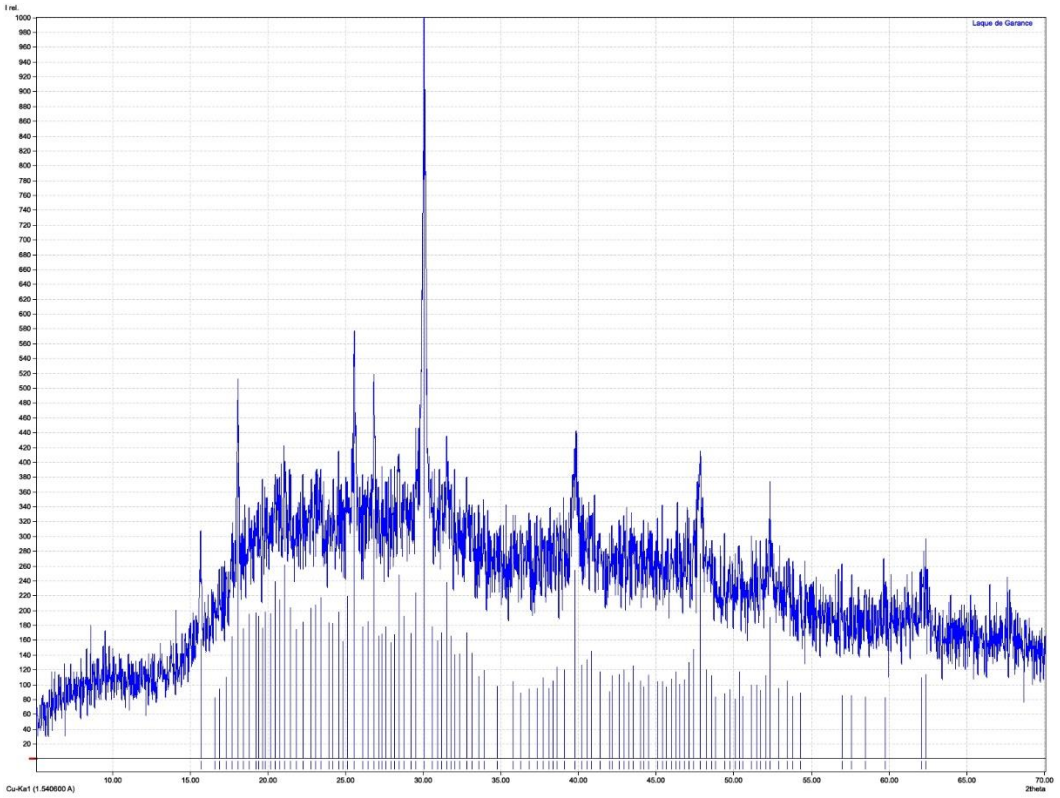


Pigment n°22 #239 Vermillon de Chine XRF

P14 Laque de Garance

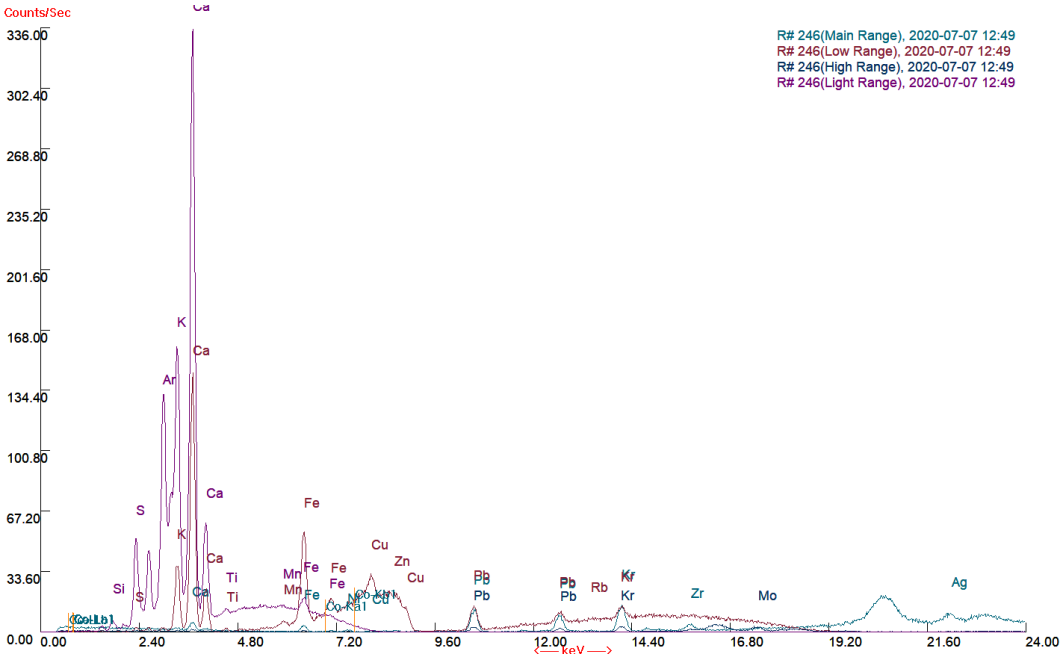


Pigment n°14 #231 Laque de Garance XRF

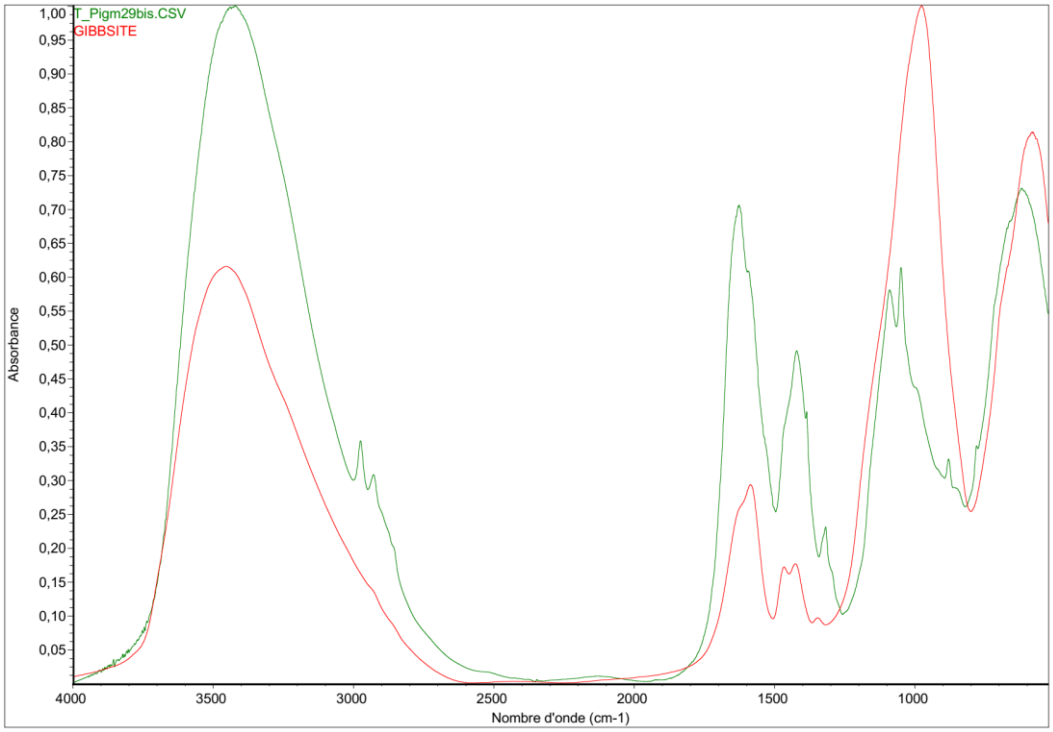


P14 XRD

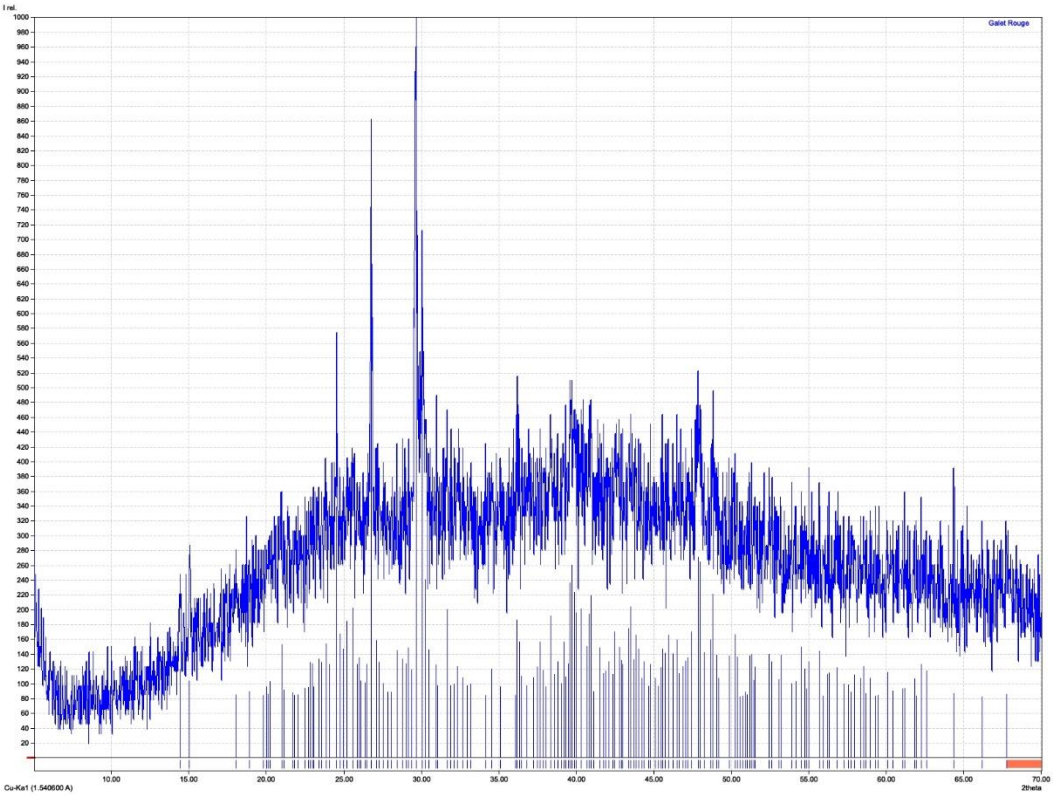
P29 Galet rouge



Pigment n°29 #246 Galet rouge XRF

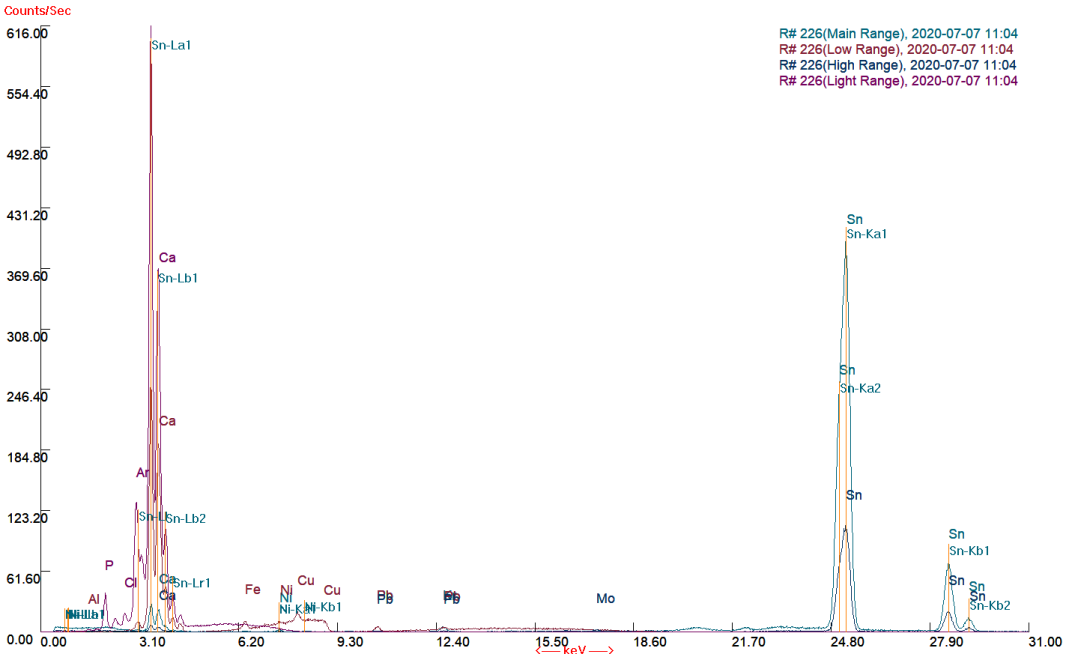


P29 FTIR

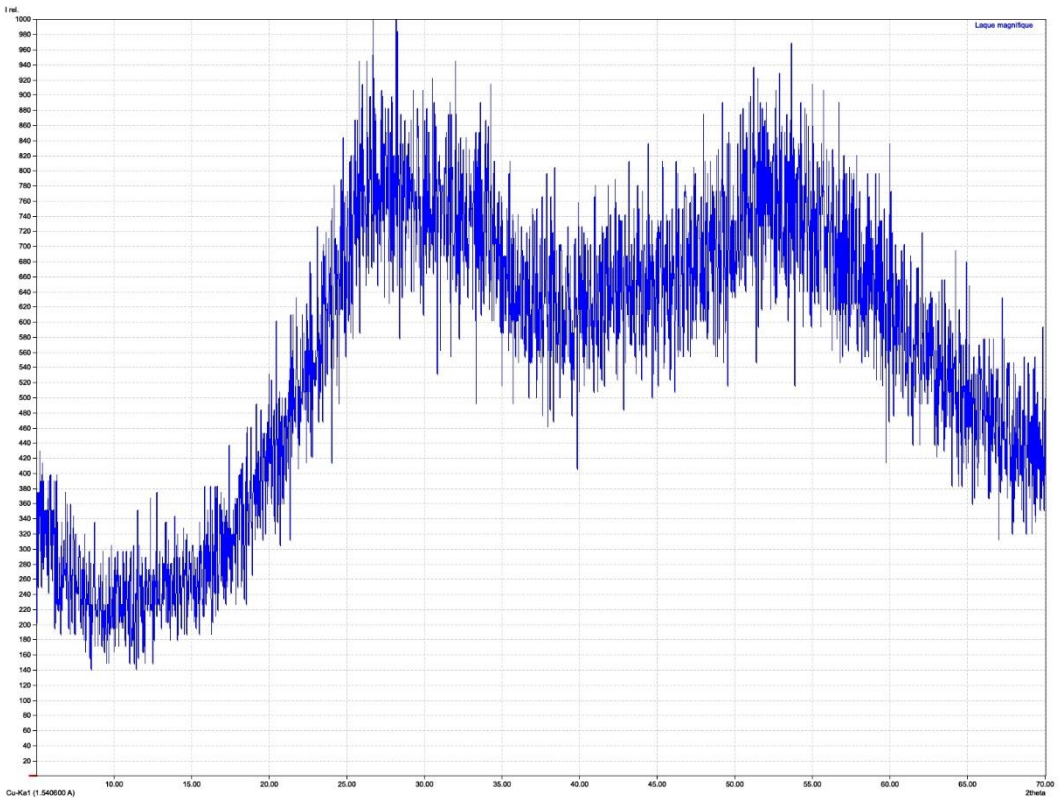


P29 XRD

P9 laque magnifique



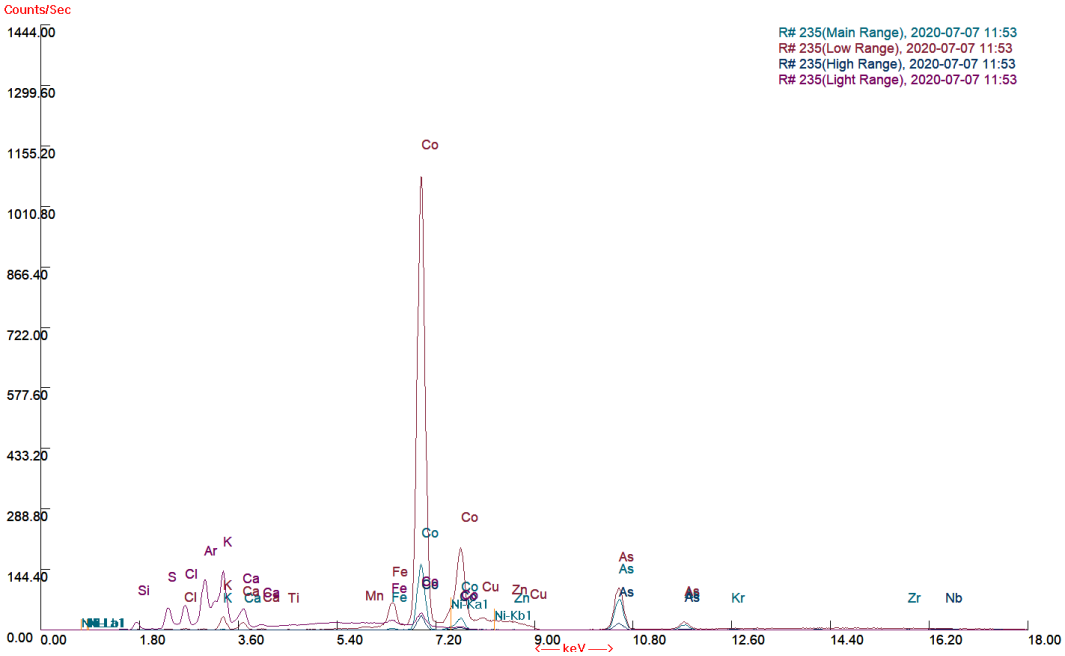
Pigment n°9 #226 laque magnifique XRF



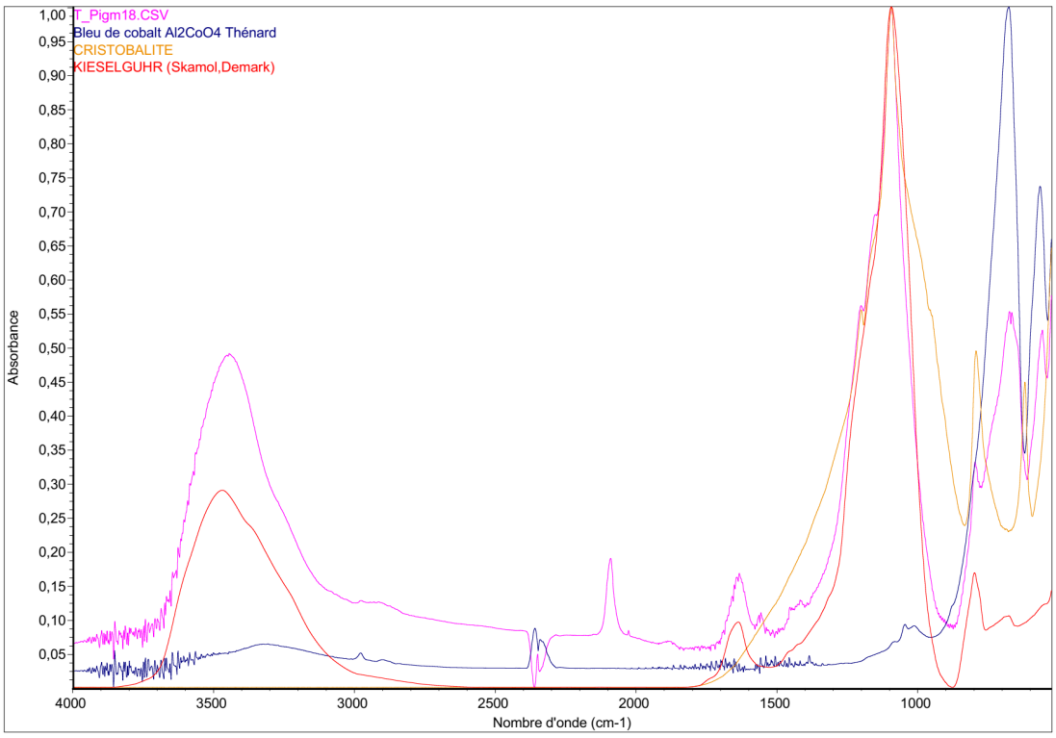
P9 XRD

Table 3

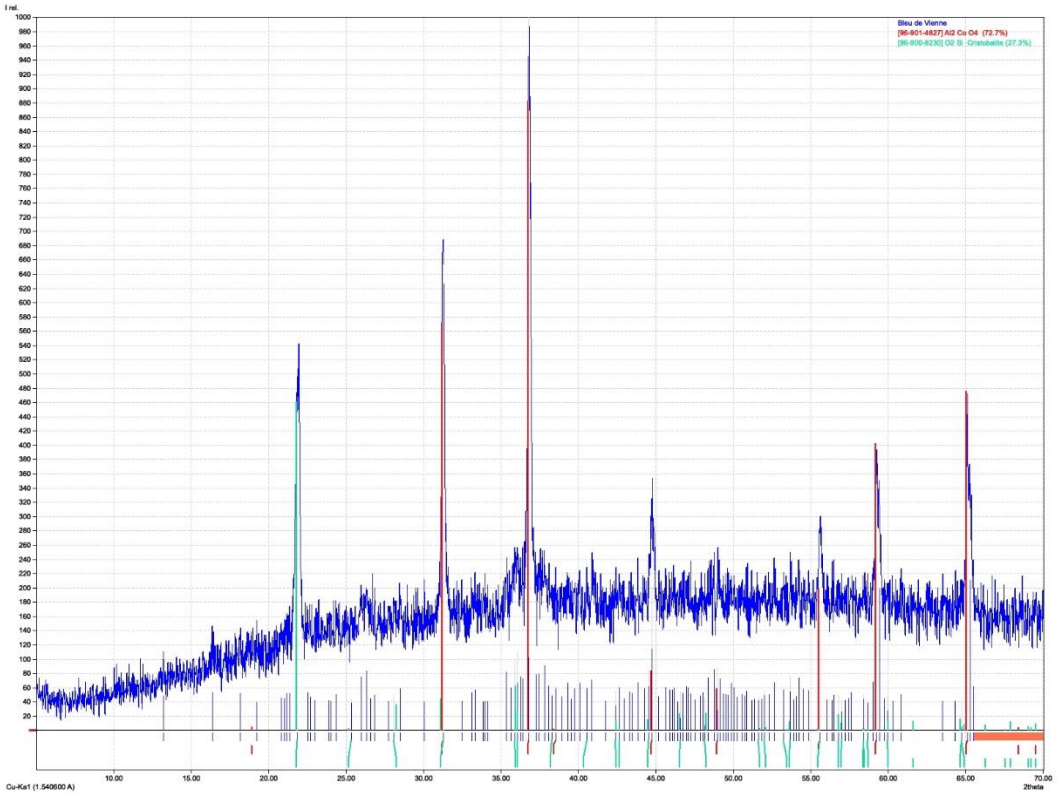
P18 Bleu de Vienne



Pigment n°18 #235 Bleu de Vienne XRF

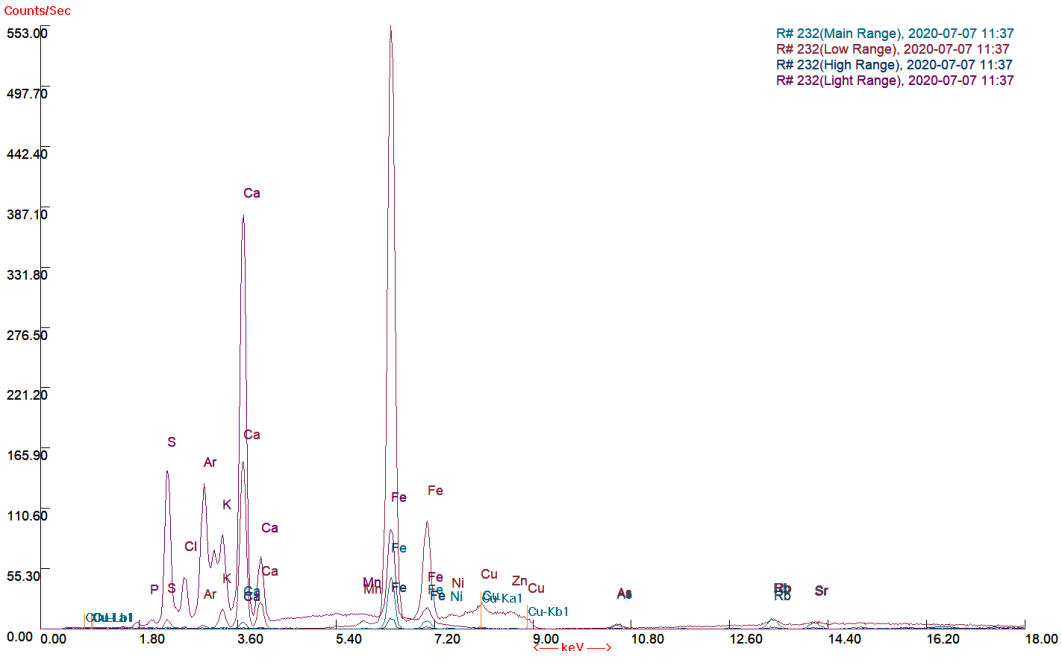


P18 FTIR

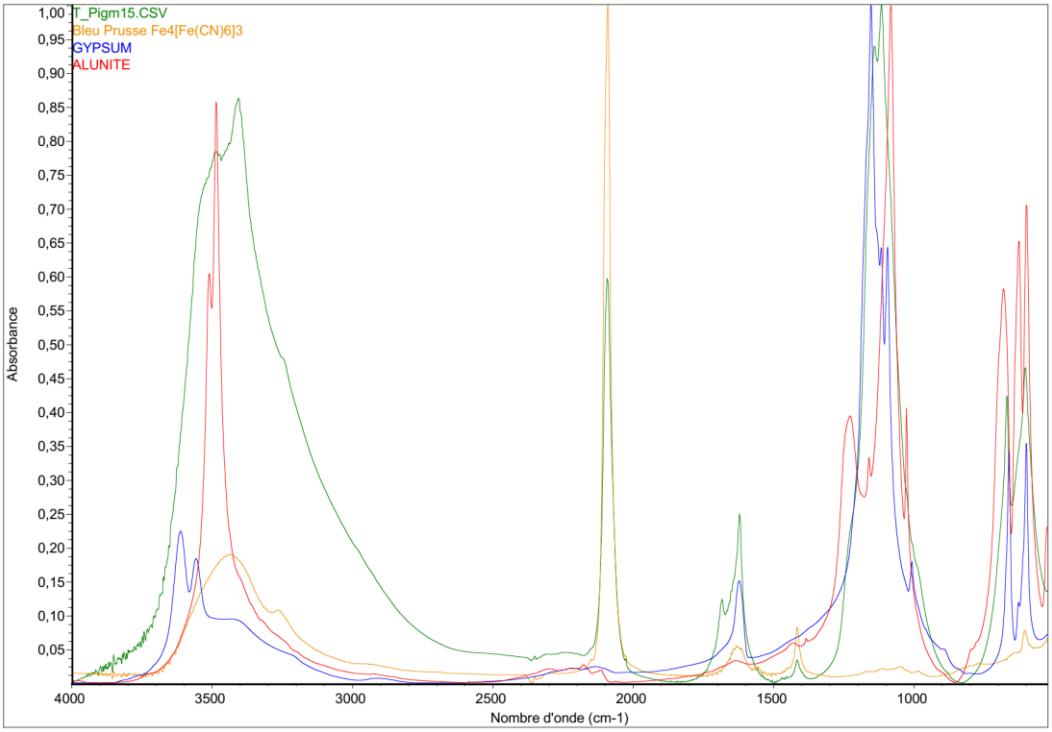


P18 XRD

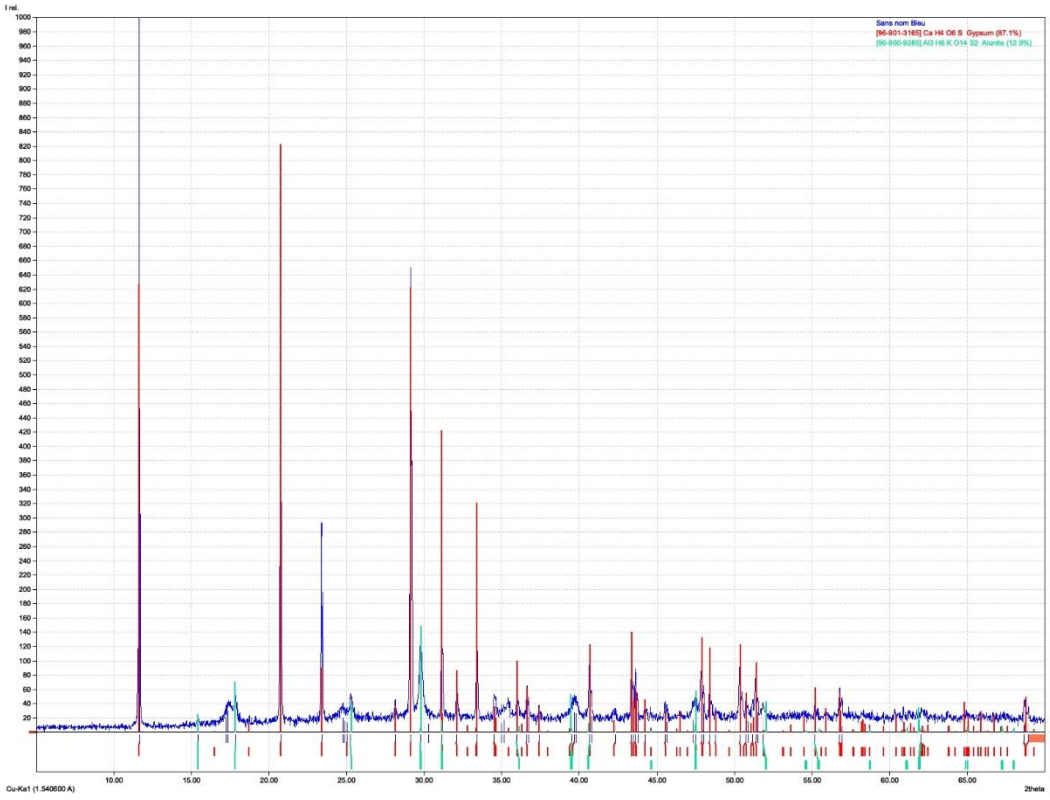
P15 Sans nom Bleu



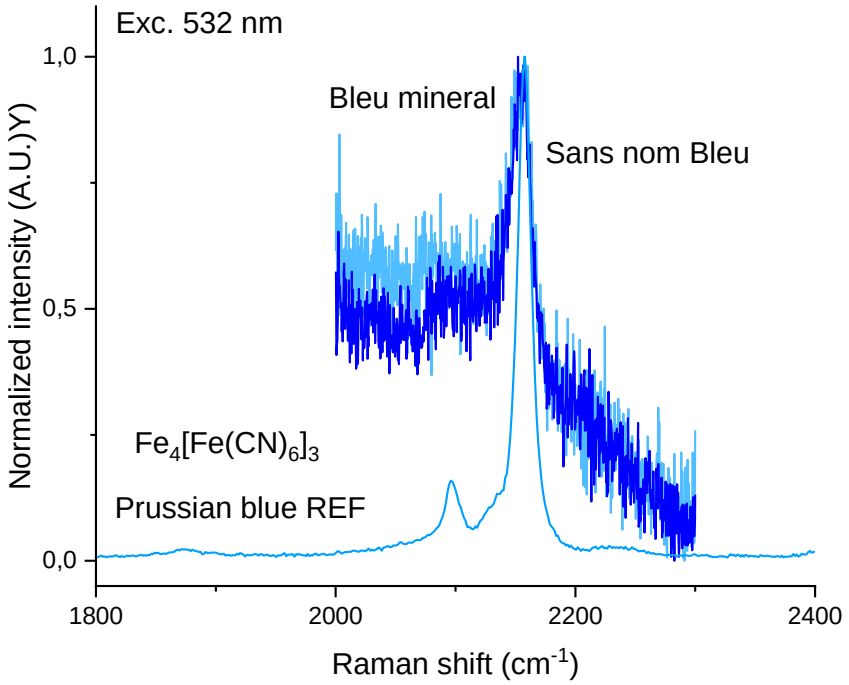
Pigment n°15 #232 Sans nom Bleu XRF



P15 FTIR

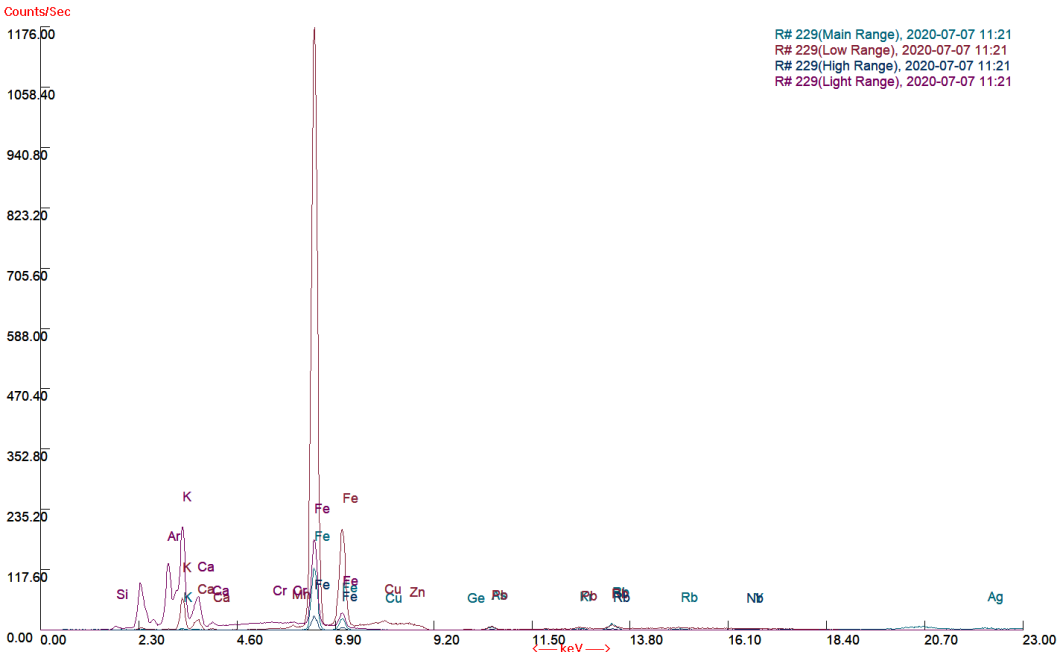


P15 XRD

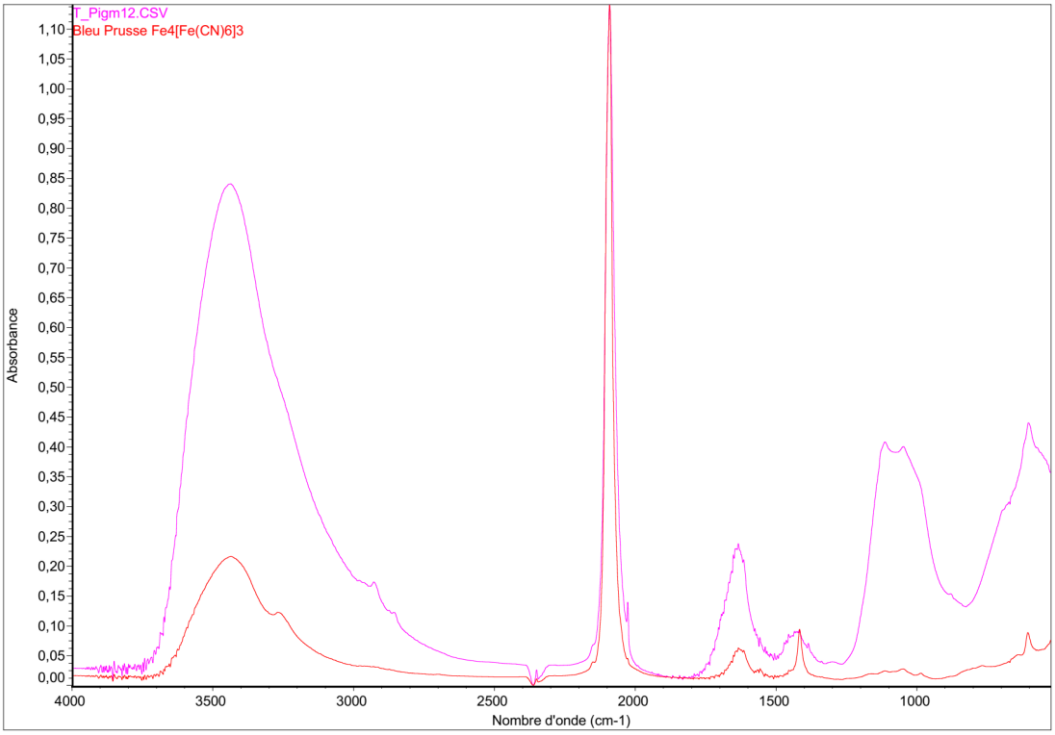


P15 Raman (compared to Prussian blue reference)

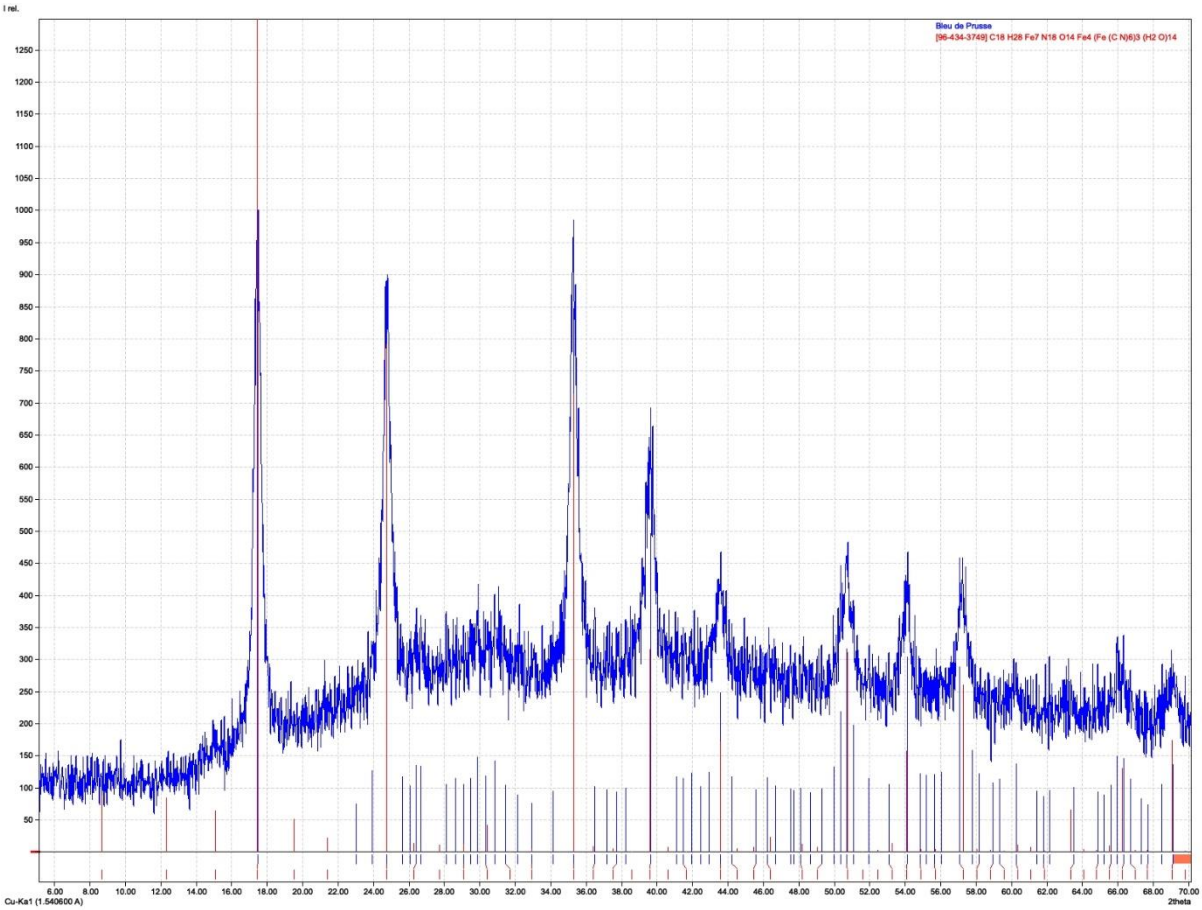
P12 Bleu de Prusse



Pigment n°12 #229 Bleu de Prusse XRF

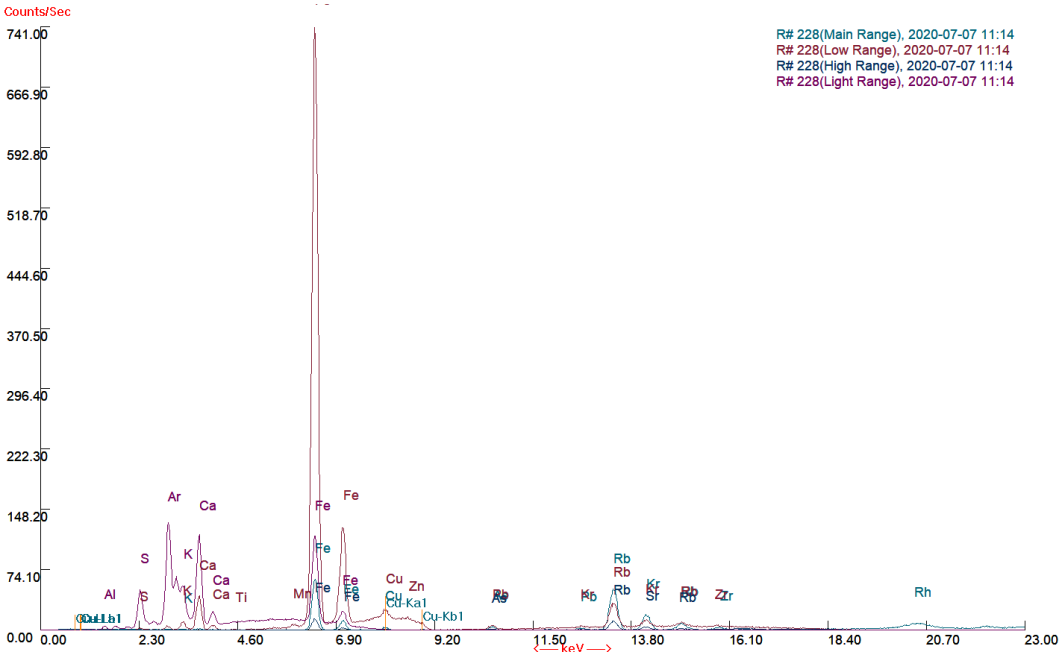


P12 FTIR

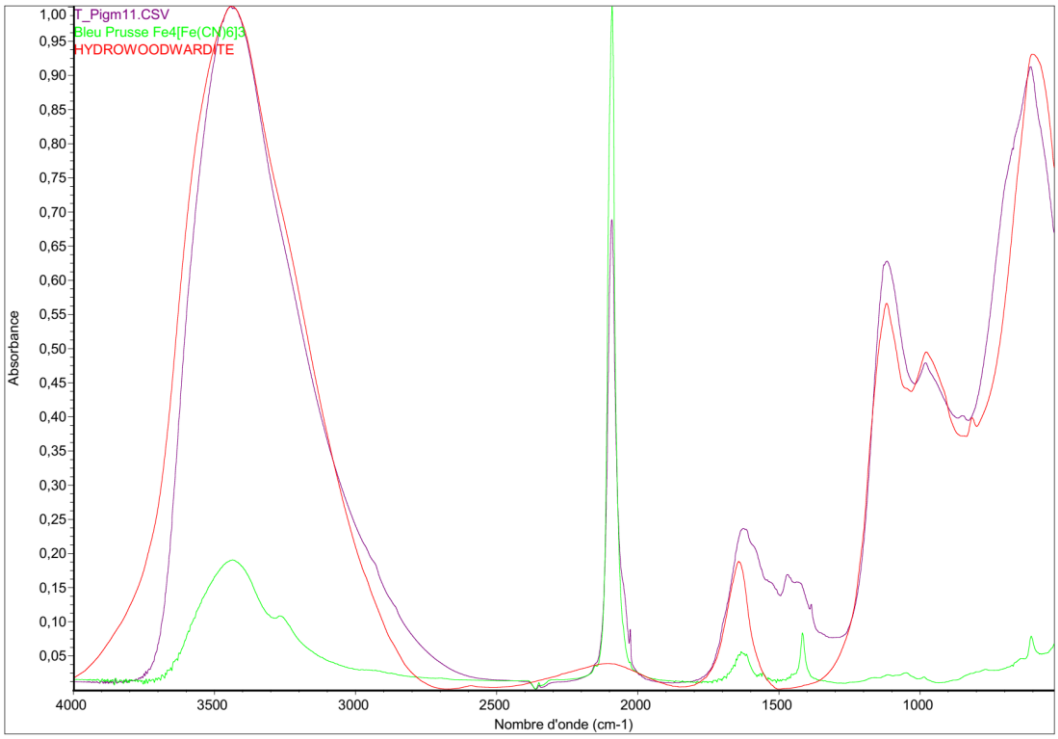


P12 XRD

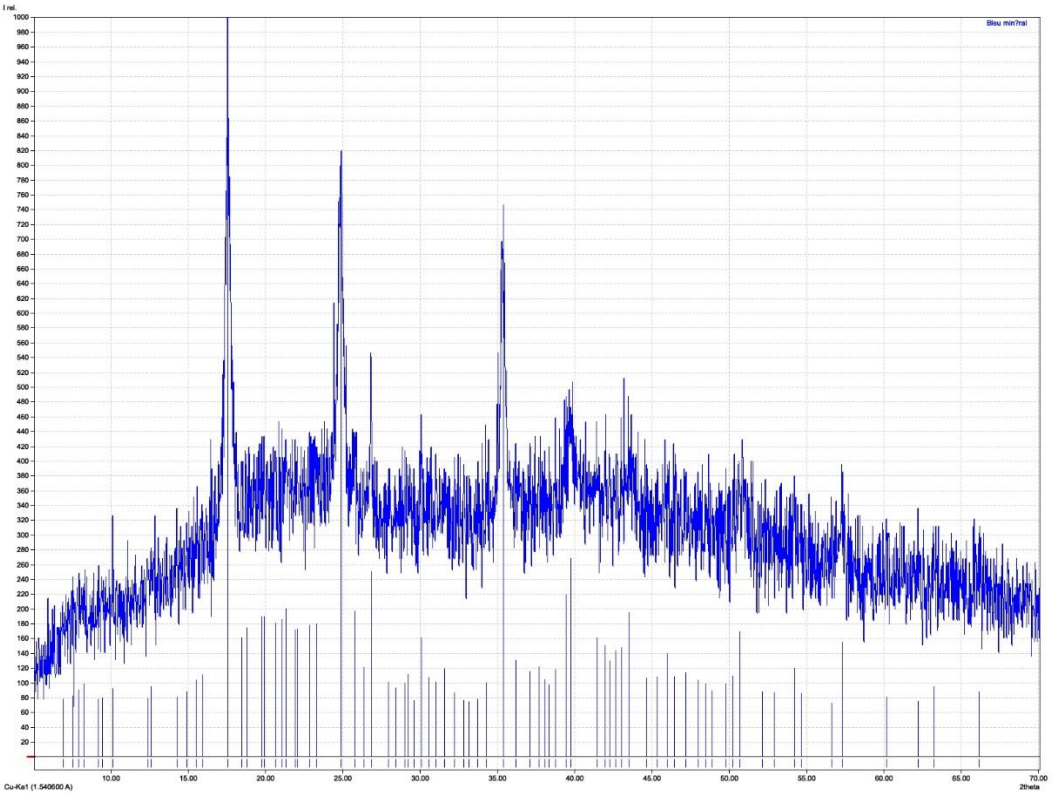
P11 Bleu minéral



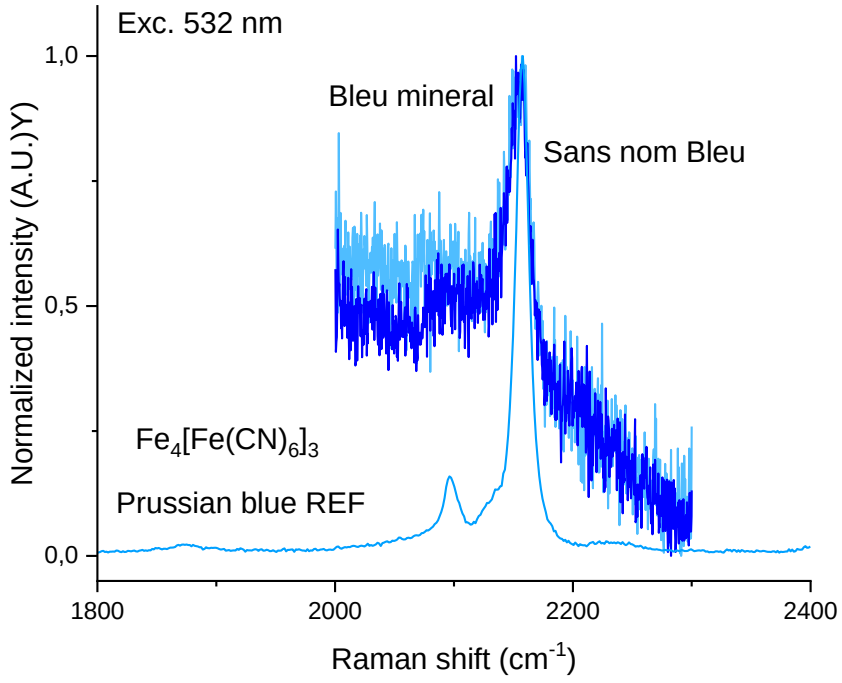
Pigment n°11 #228 Bleu minéral XRF



P11 FTIR

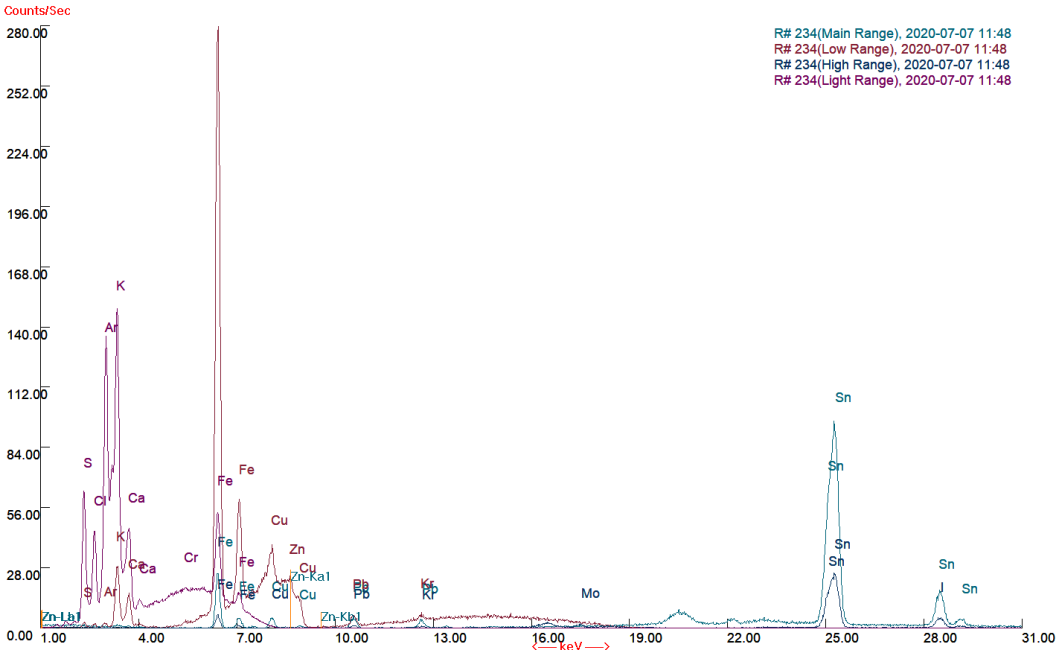


P11 XRD

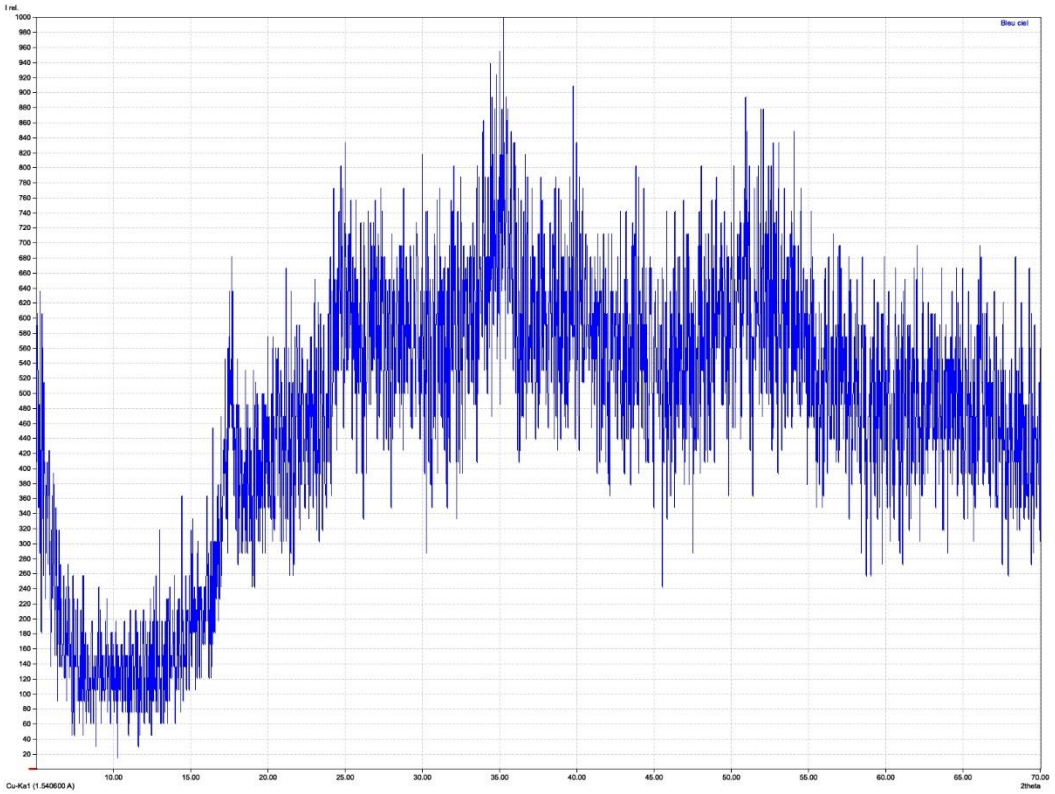


P11 Raman (compared to Prussian blue reference)

P17 Bleu ciel

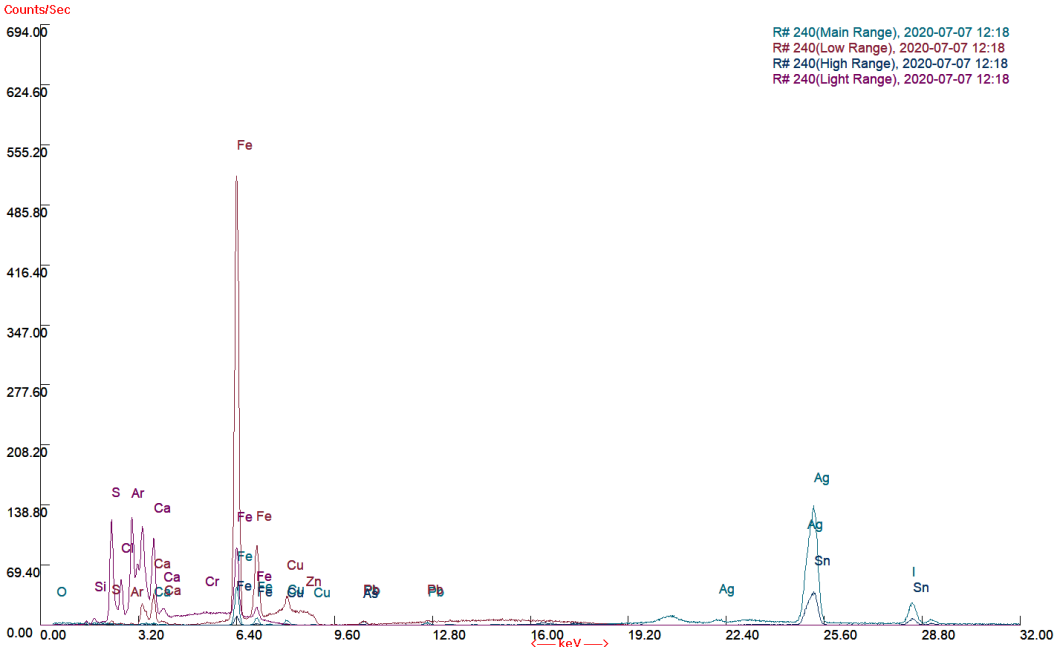


Pigment n°17 #234 Bleu ciel XRF

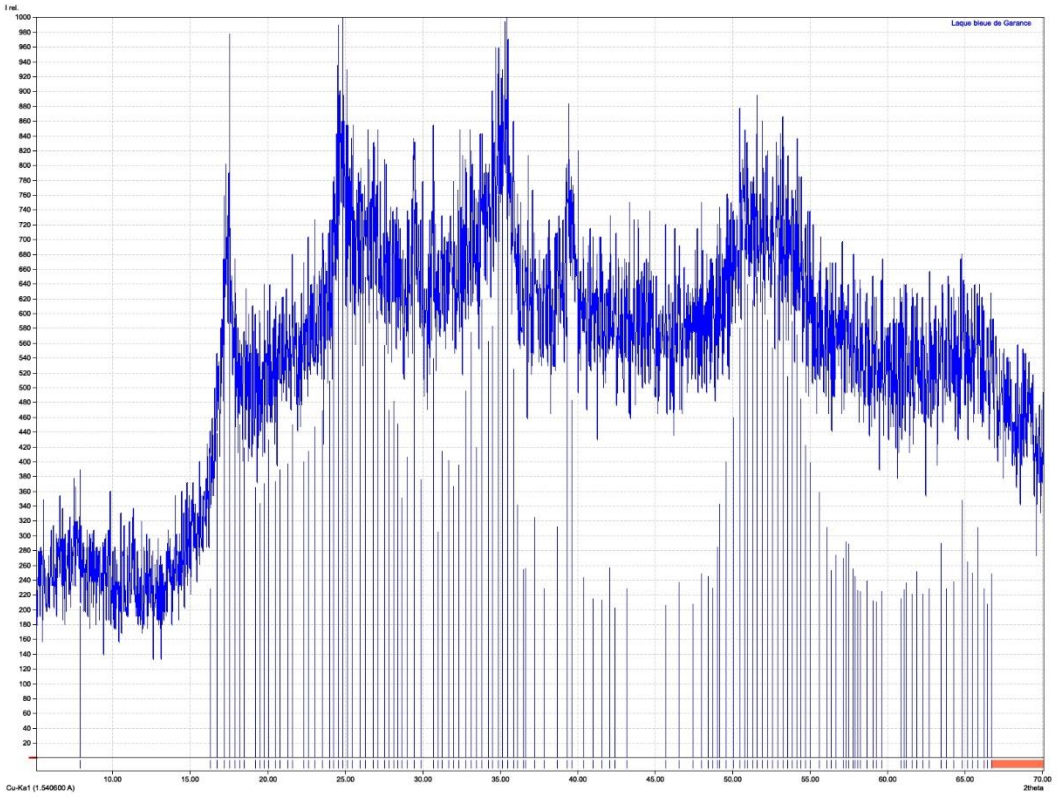


P17 XRD

P23 Laque bleue de Garance

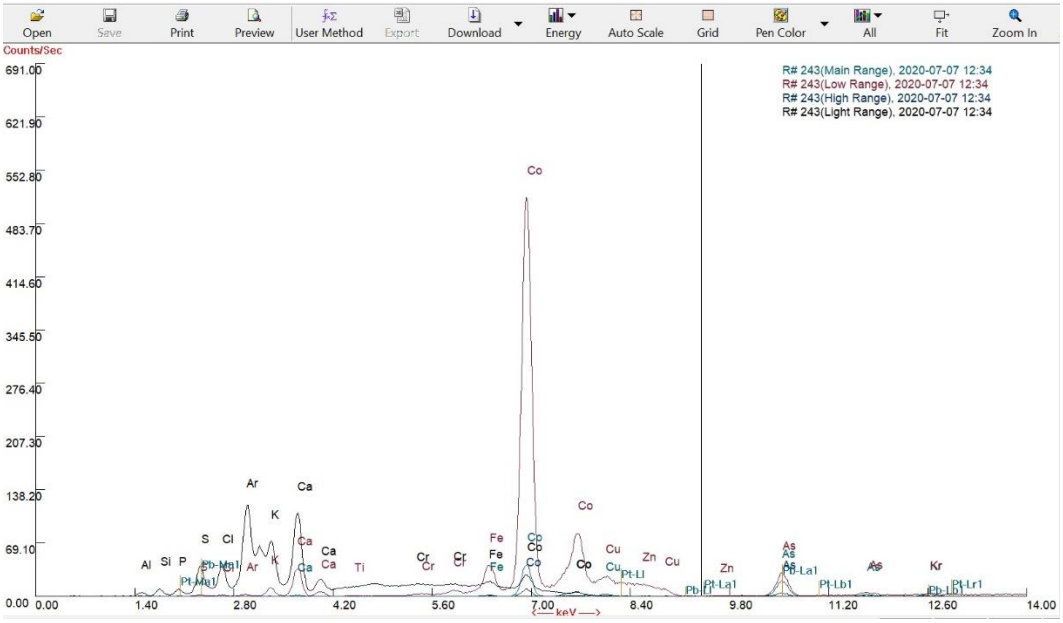


Pigment n°23 #240 Laque bleue de Garance XRF

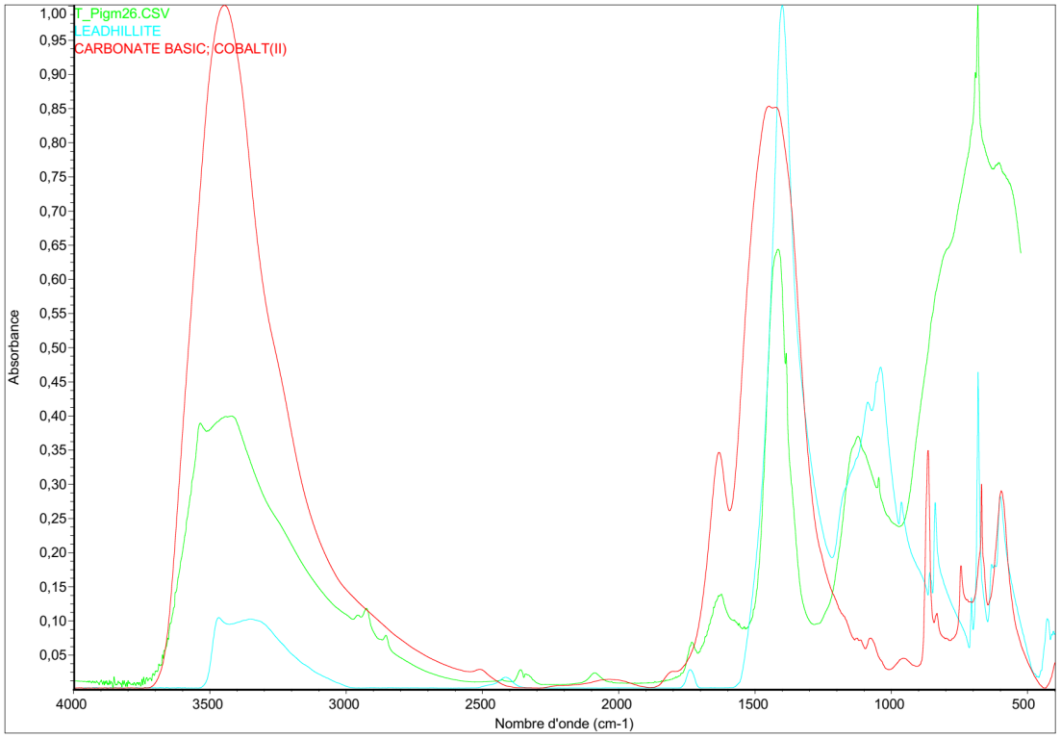


P23 XRD

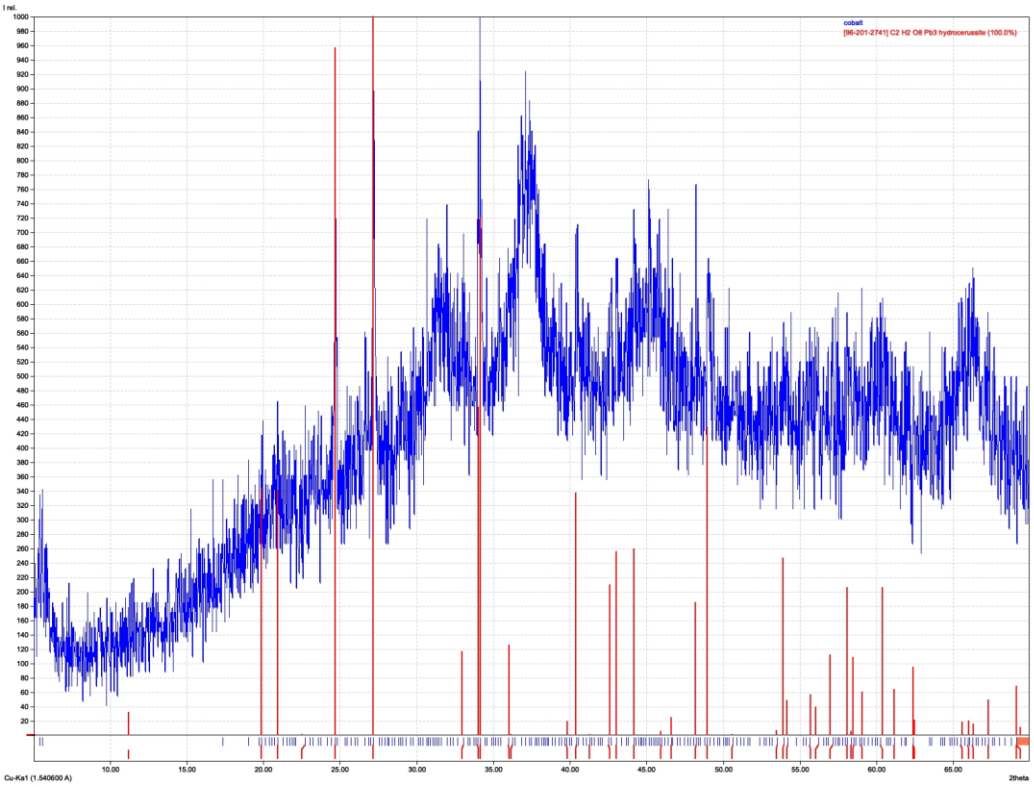
P26 Cobalt



Pigment n°26 #243 Cobalt XRF



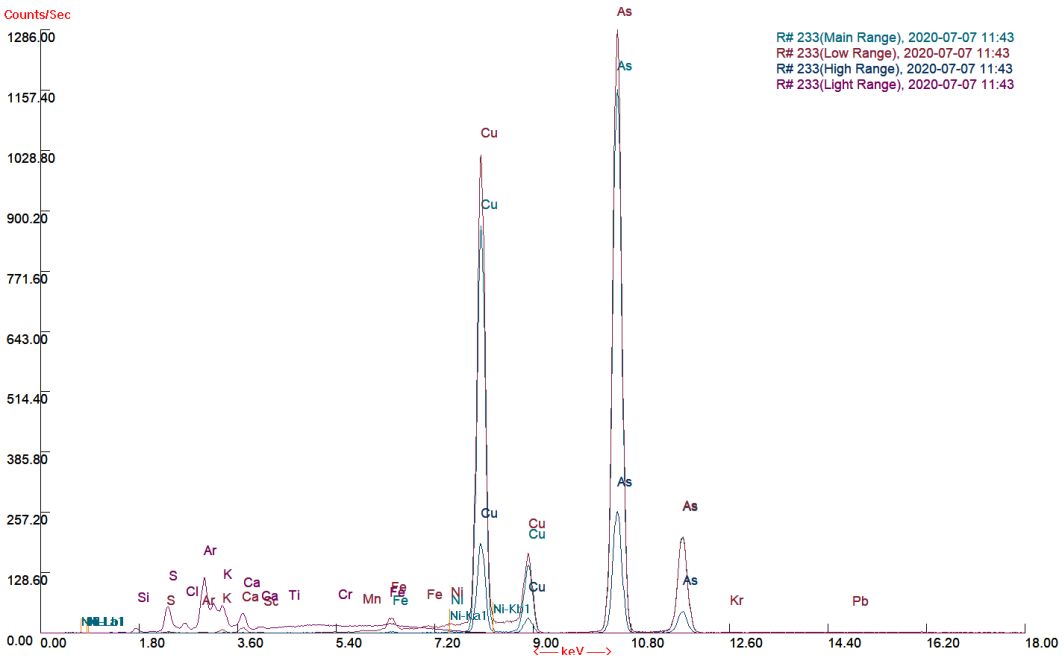
P26 FTIR


I rel.
cobalt
[96-201-2741] C2 H2 O8 Pb3 hydrocerussite (100.0%)
Cu-Ka1 (1.540600 A)
2theta

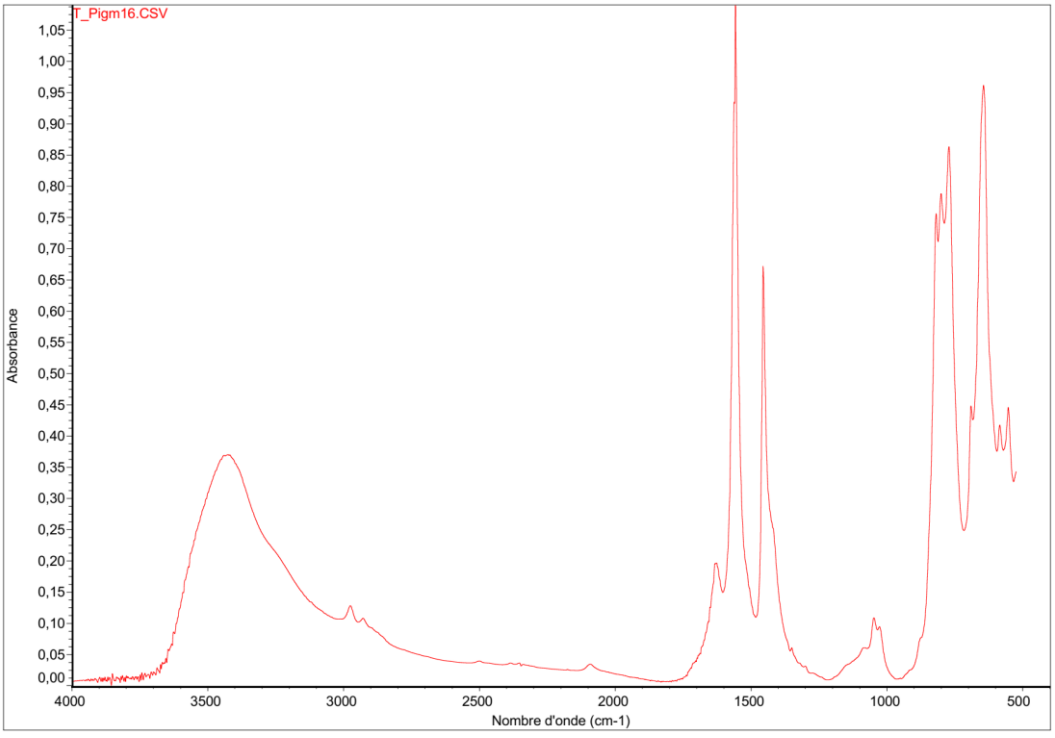
P26 XRD

Table 4

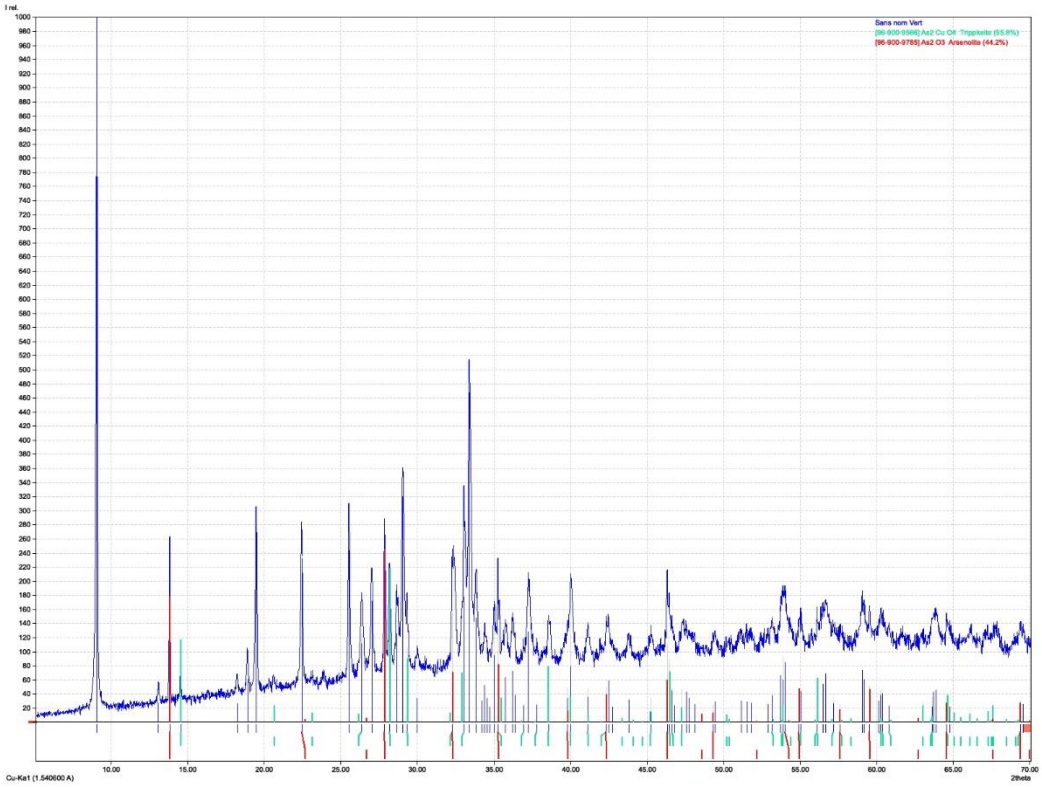
P16 Sans nom vert



Pigment n°16 #233 Sans nom vert XRF

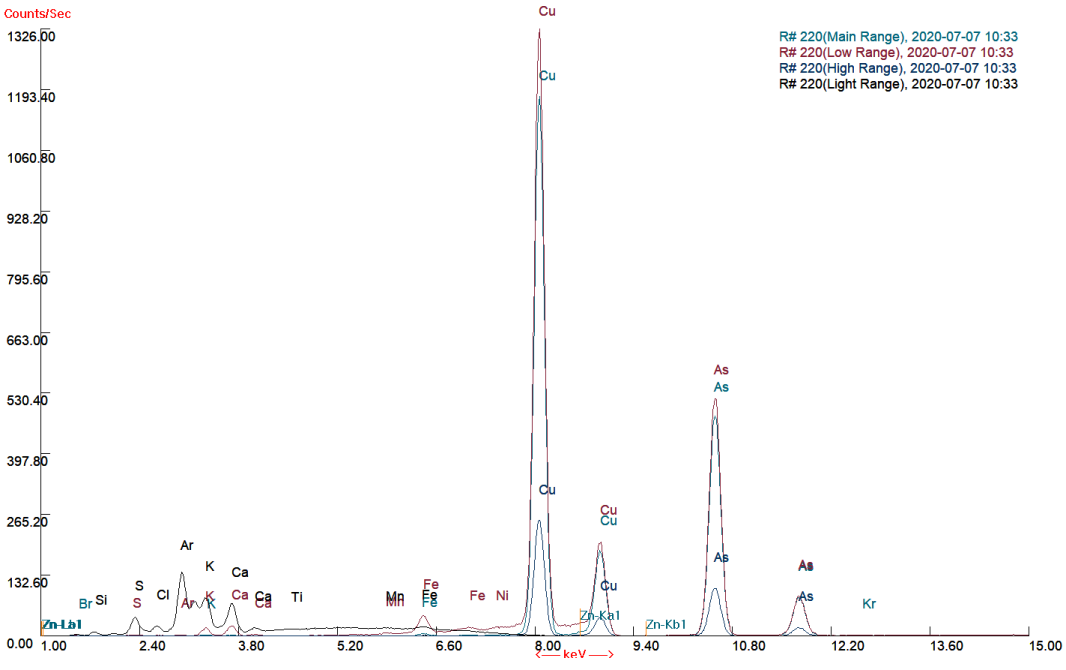


P16 FTIR

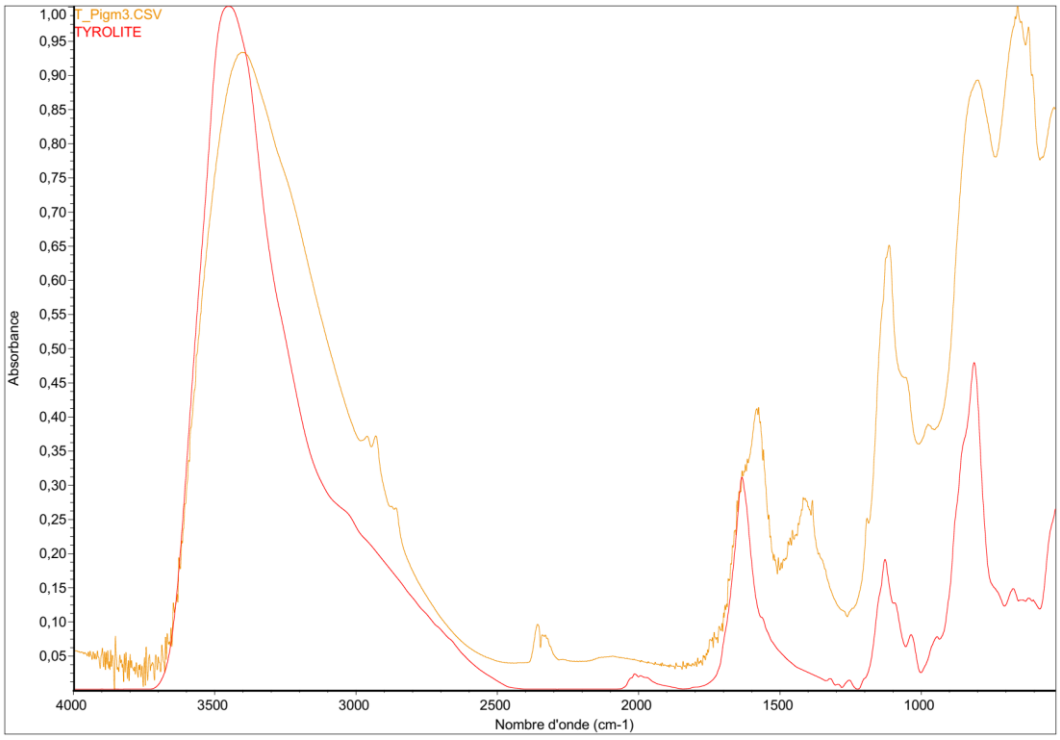


P16 XRD

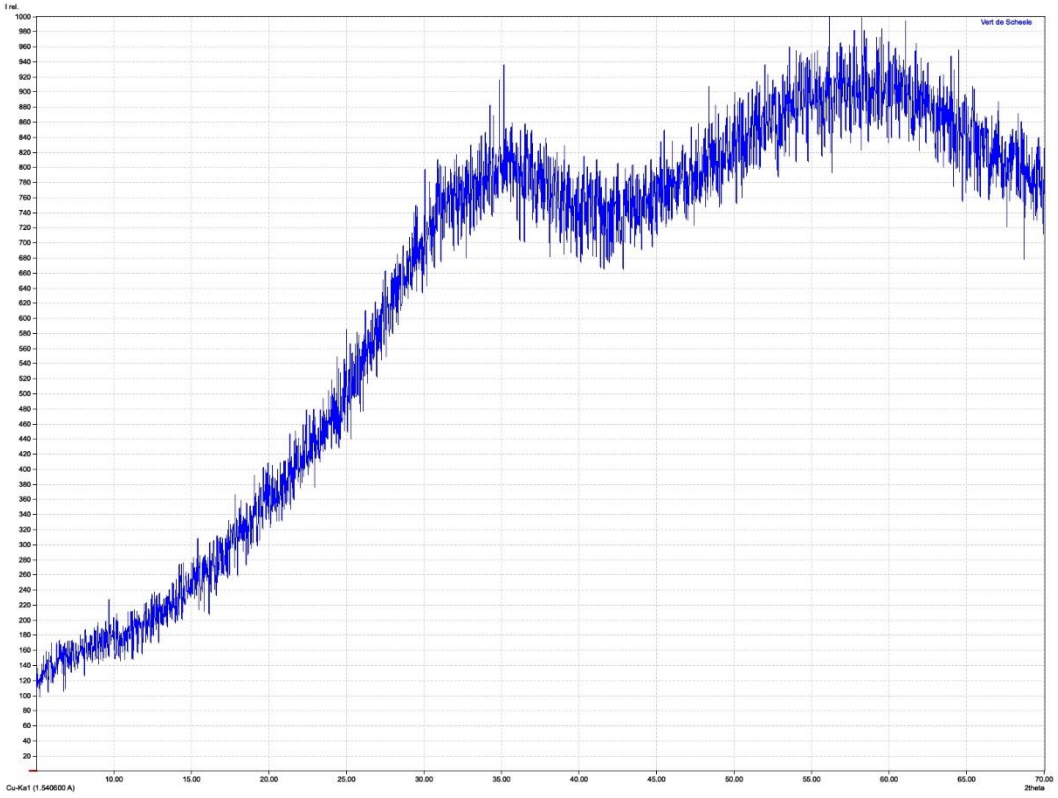
P3 Vert de Scheele



Pigment n°3 #220 Vert de Sheele XRF

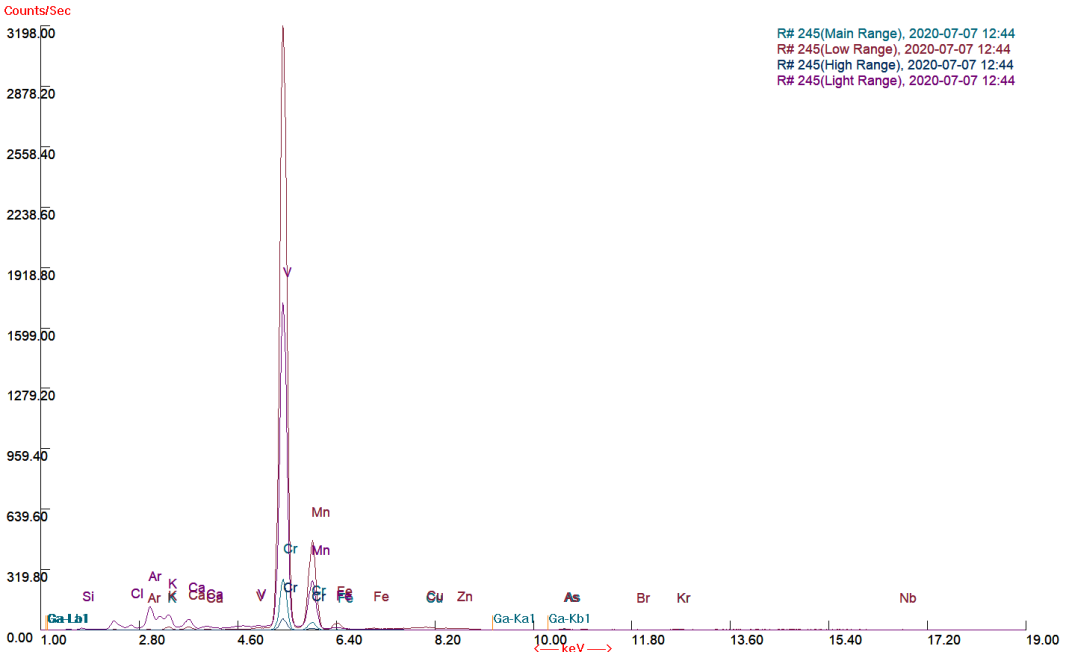


P3 FTIR

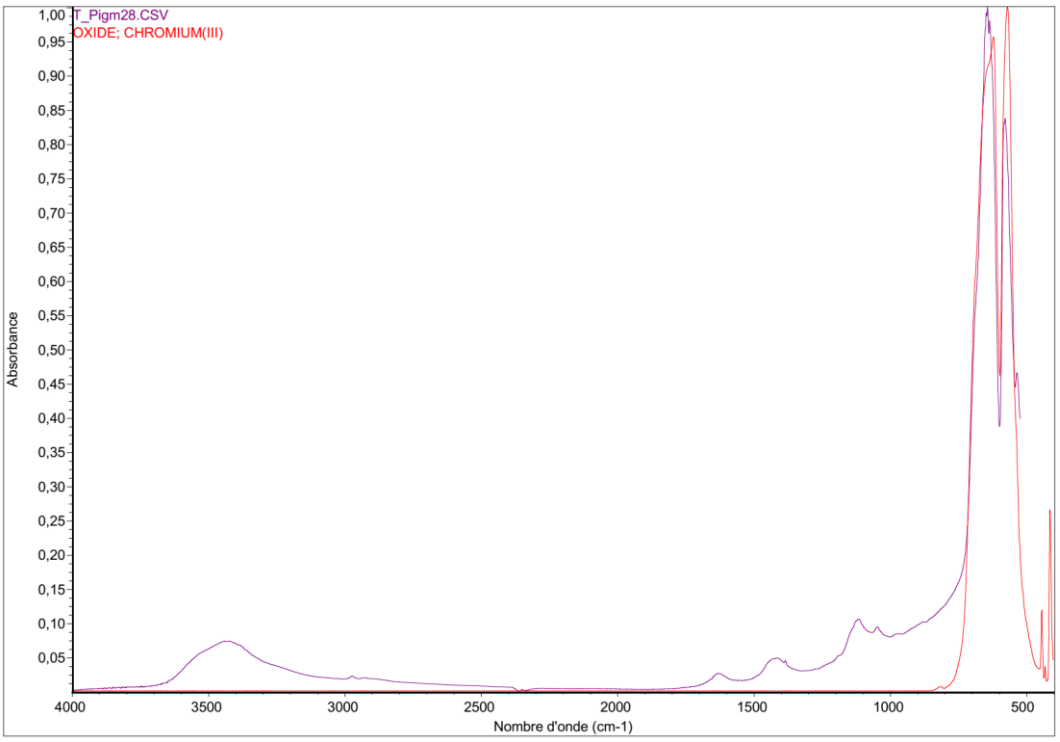


P3 XRD

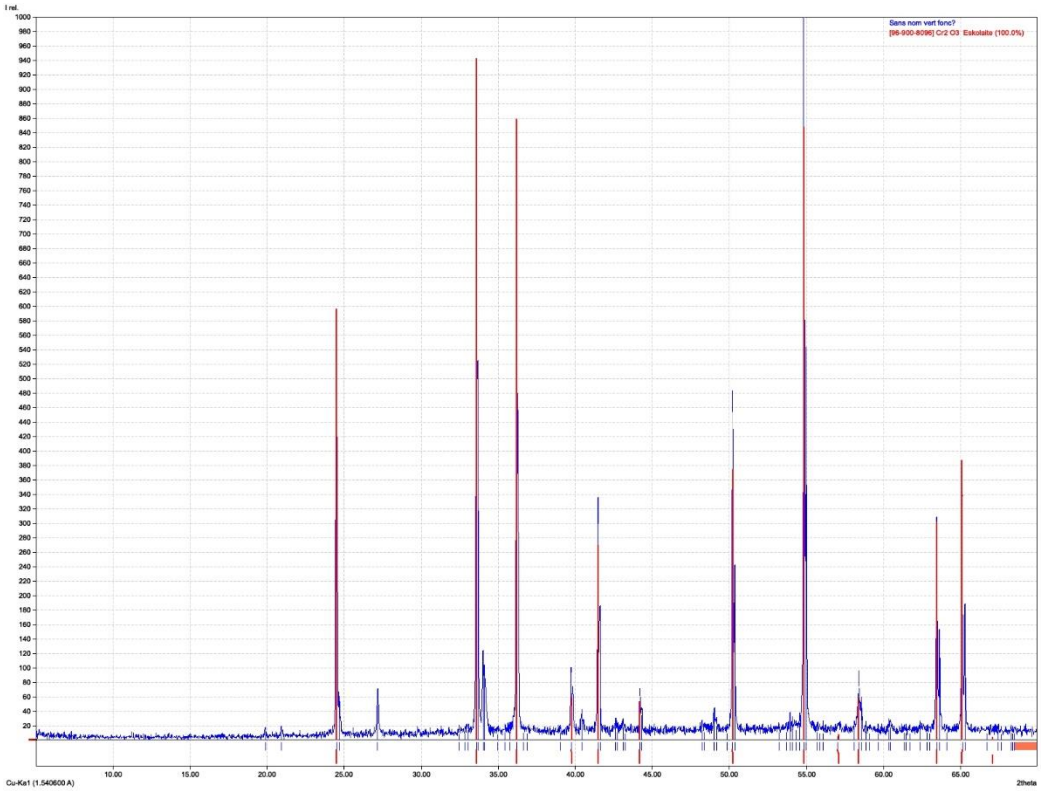
P28 Sans nom vert foncé



Pigment n°28 #245 Sans nom vert foncé XRF



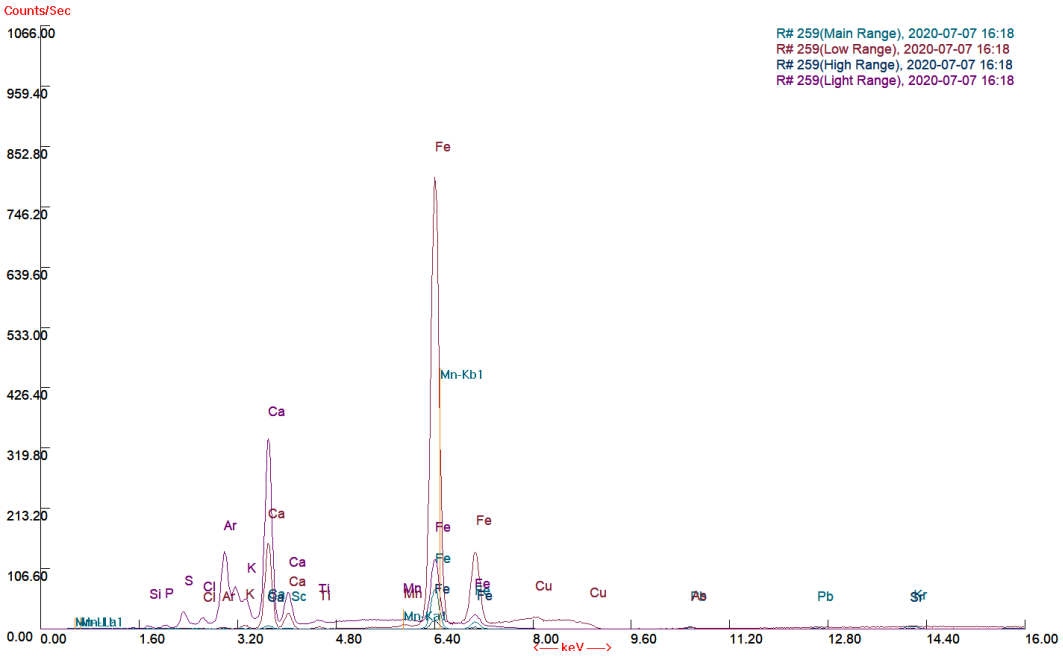
P28 FTIR


I rel.
Sans nom vert foncé
[96-900-8096] Cr2 O3 Eskolaite (100.0%)
Cu-Ka1 (1.540600 A)
2theta

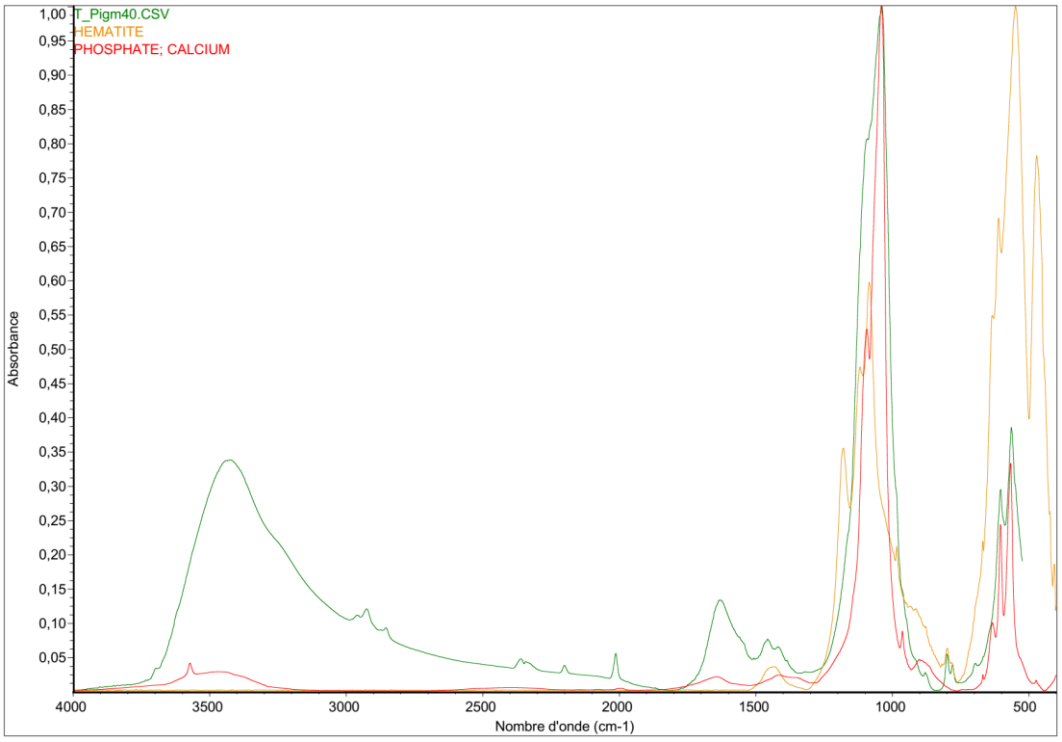
P28 XRD

Table 5

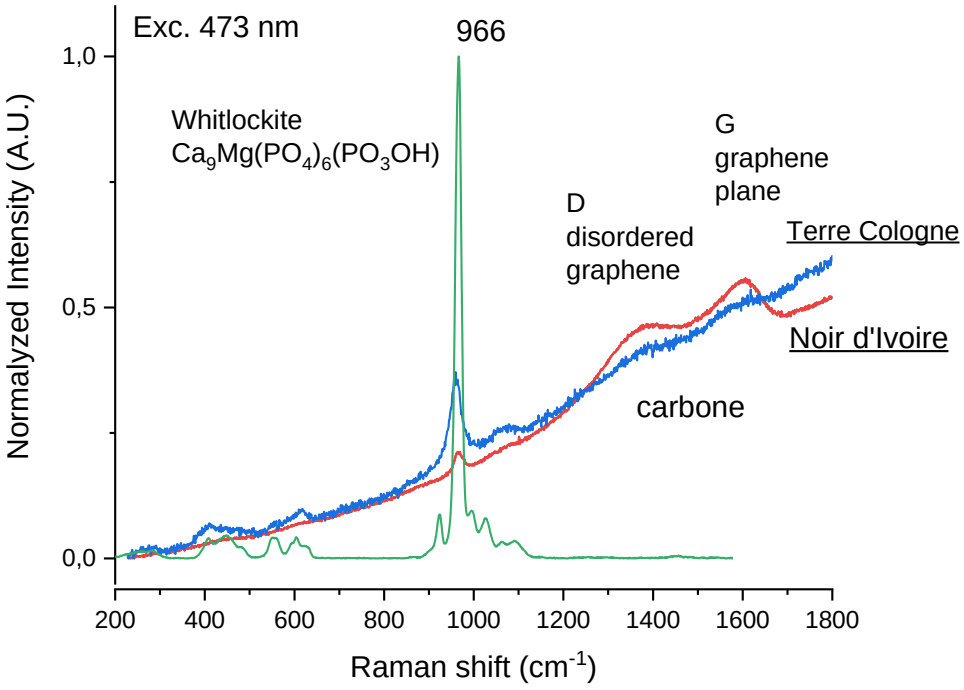
P40 Terre de Cologne



Pigment n°40 #259 Terre de Cologne XRF

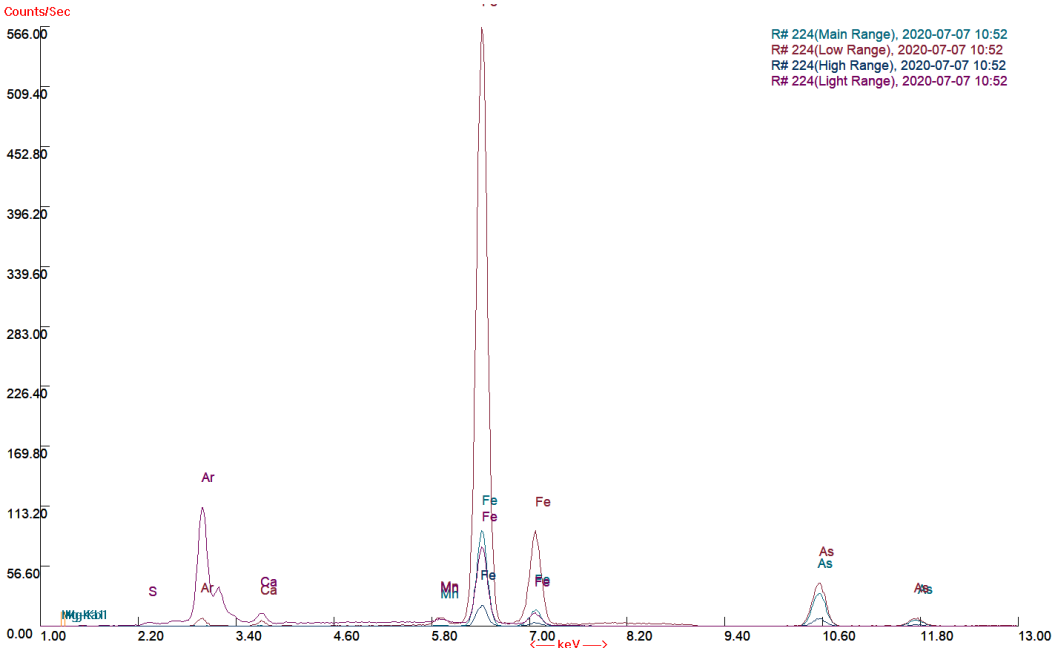


P40 FTIR

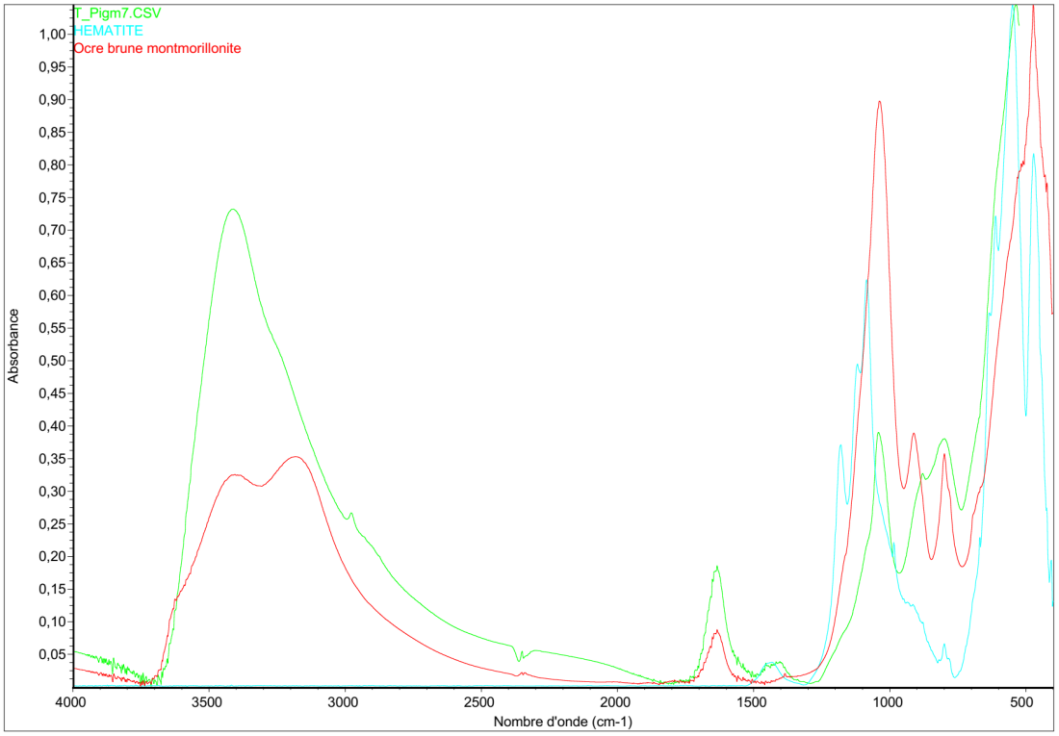


P40 Raman (compared to the Noir de vigne pigmented powder and to whitlockite reference)

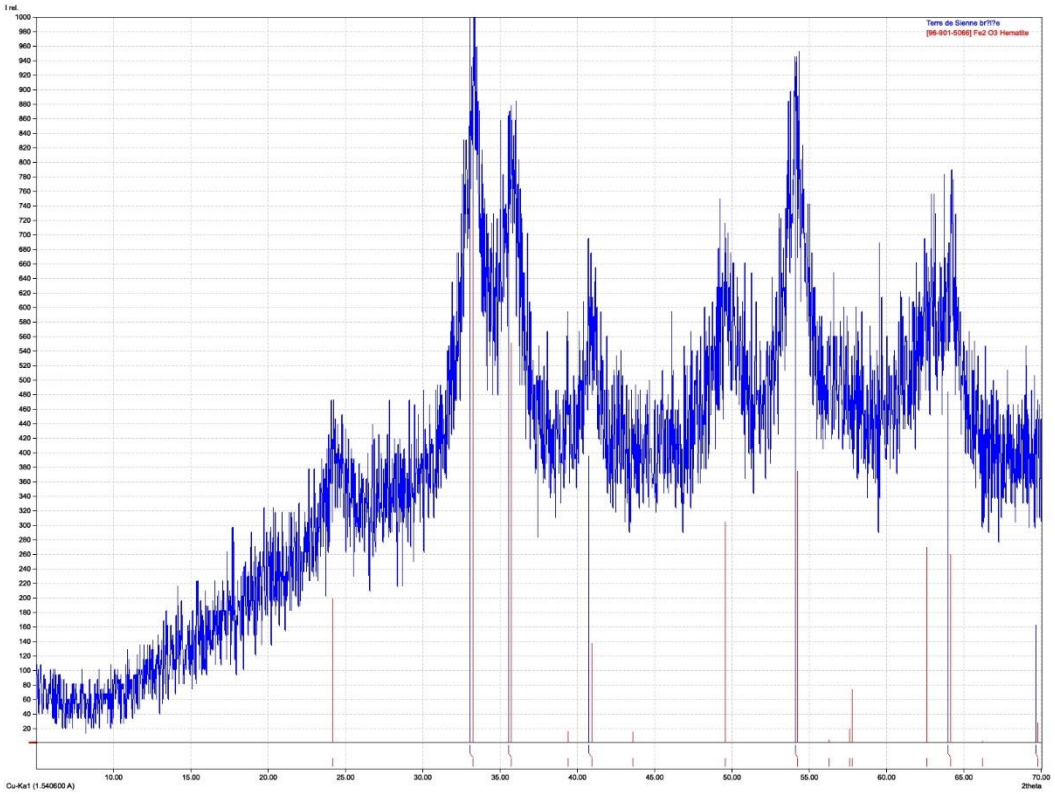
P7 Terre de Sienne brulé



Pigment n°7 #224 Terre de Sienne brulé XRF

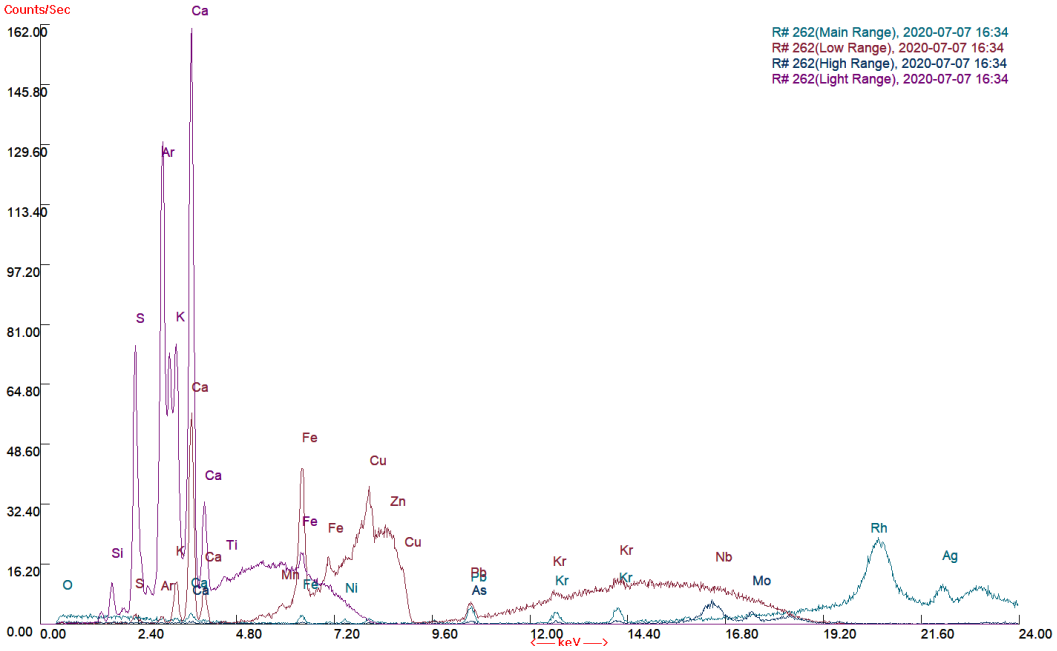


P7 FTIR

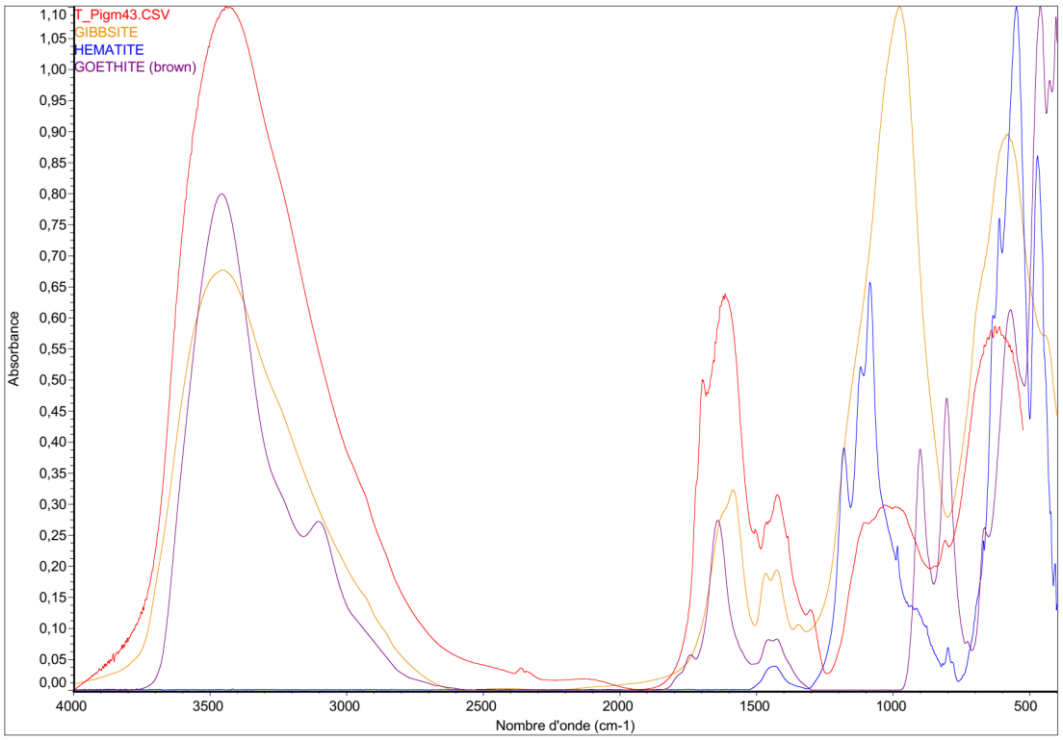


P7 XRD

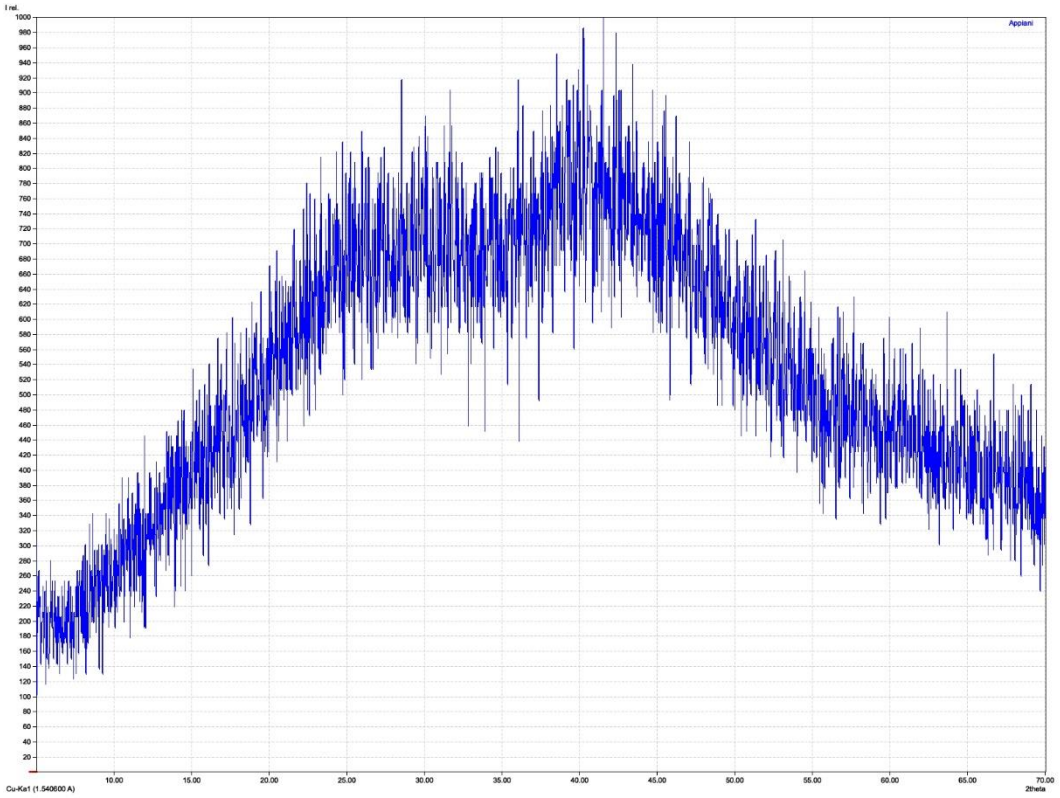
P43 Appiani



Pigment n°43 #262 Appiani XRF

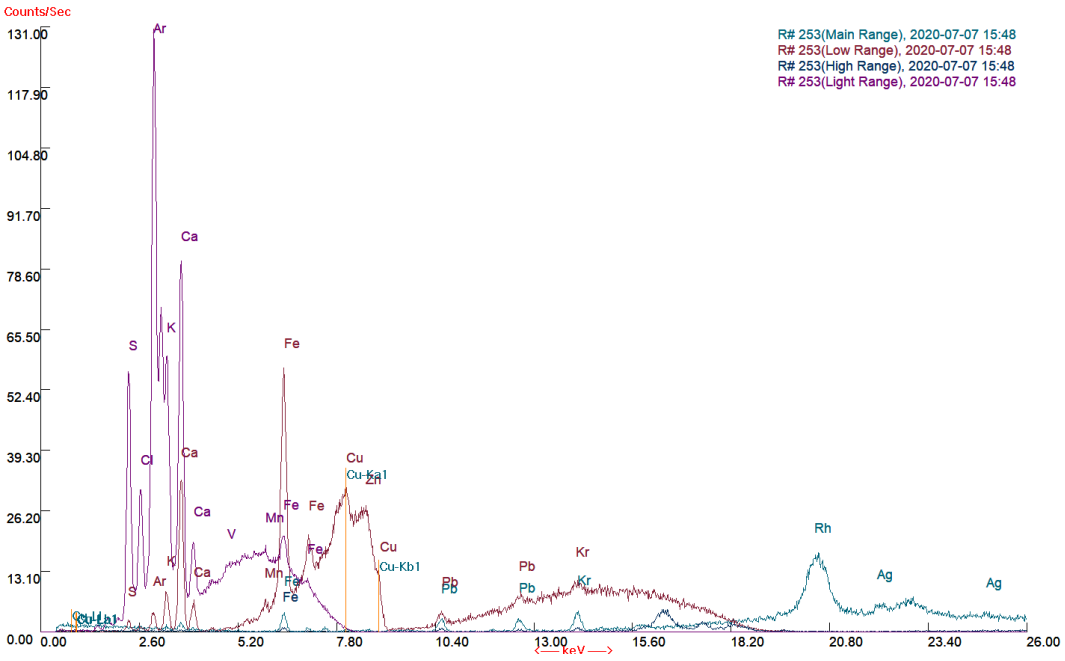


P43 FTIR

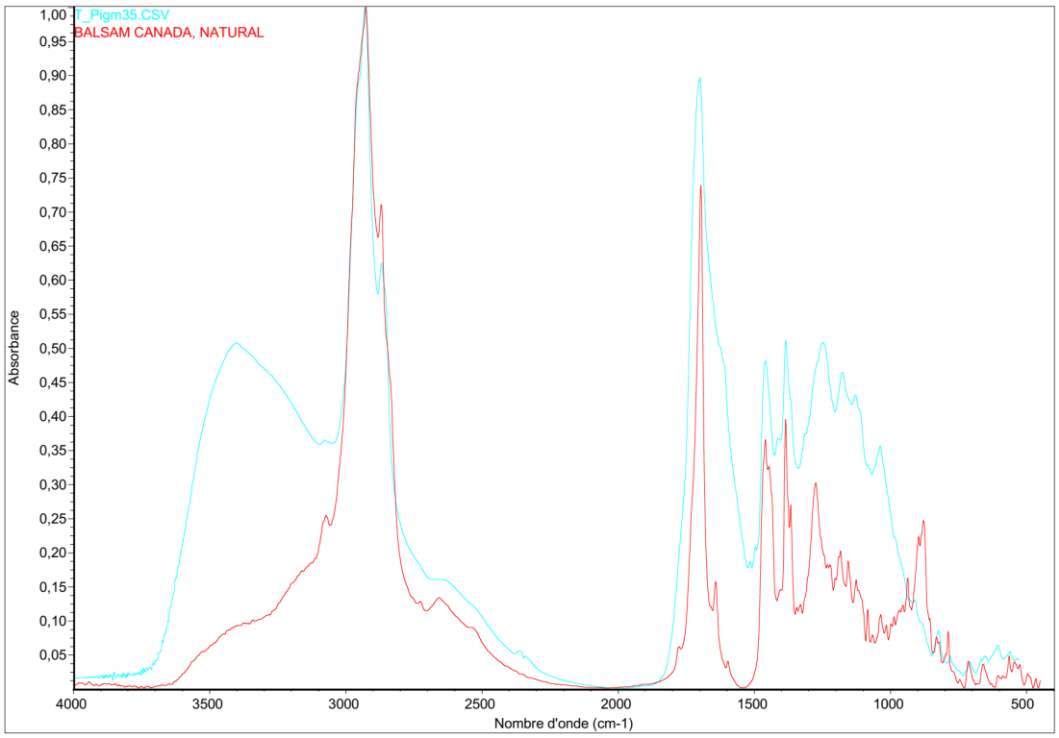


P43 XRD

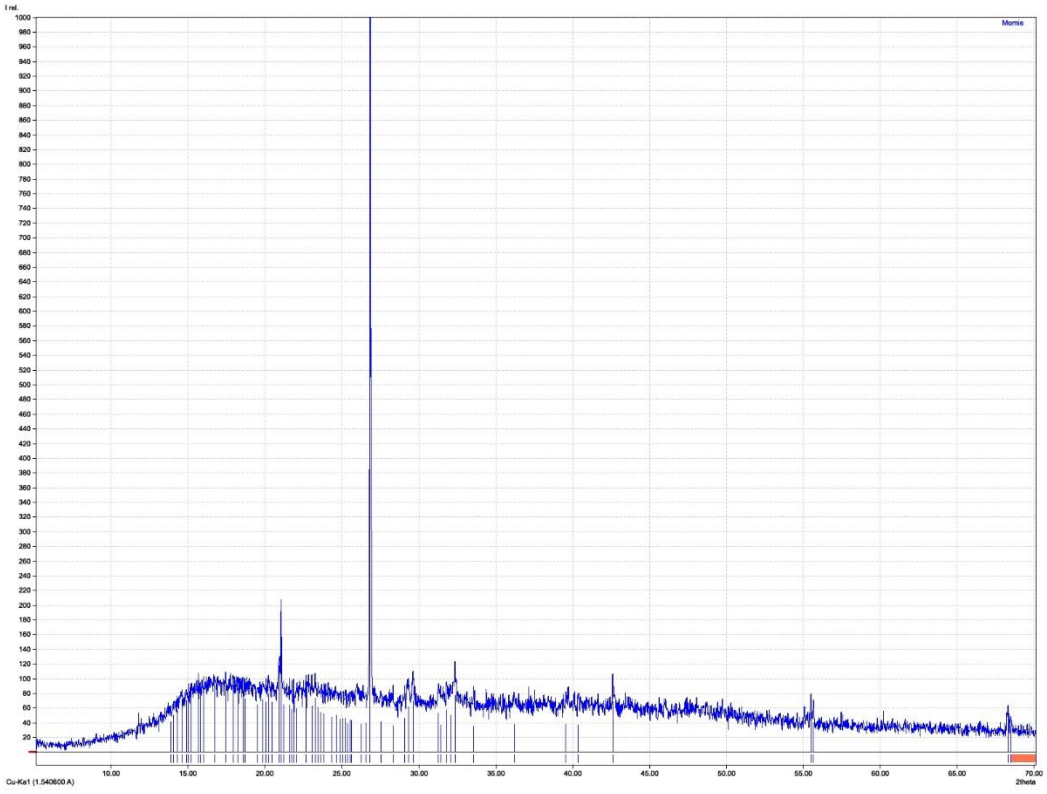
P35 Momie



Pigment n°35 #253 Momie XRF



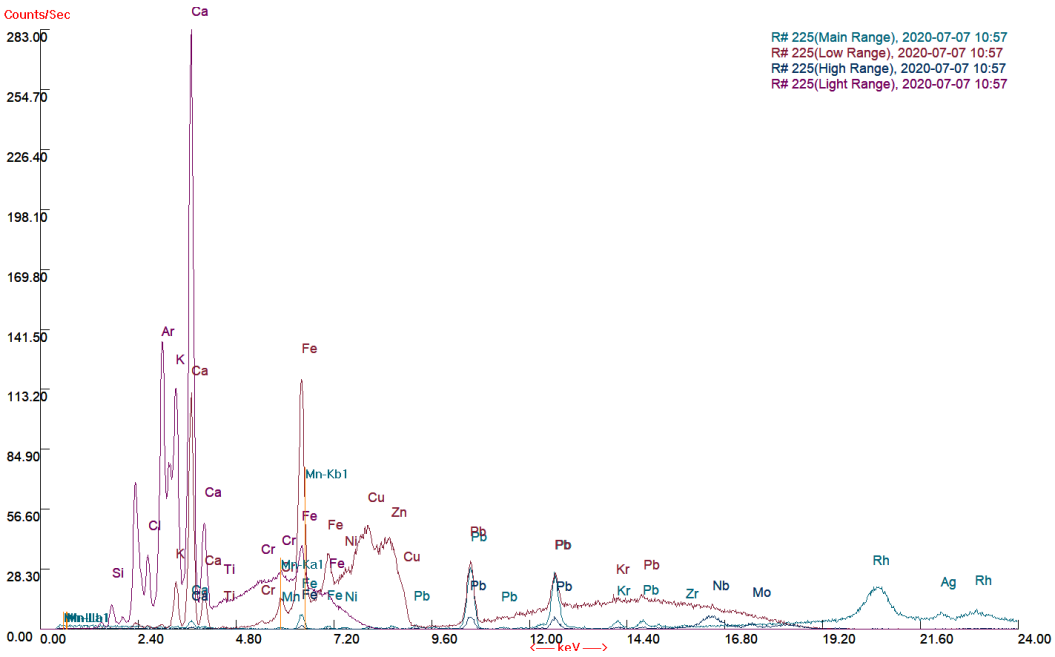
P35 FTIR



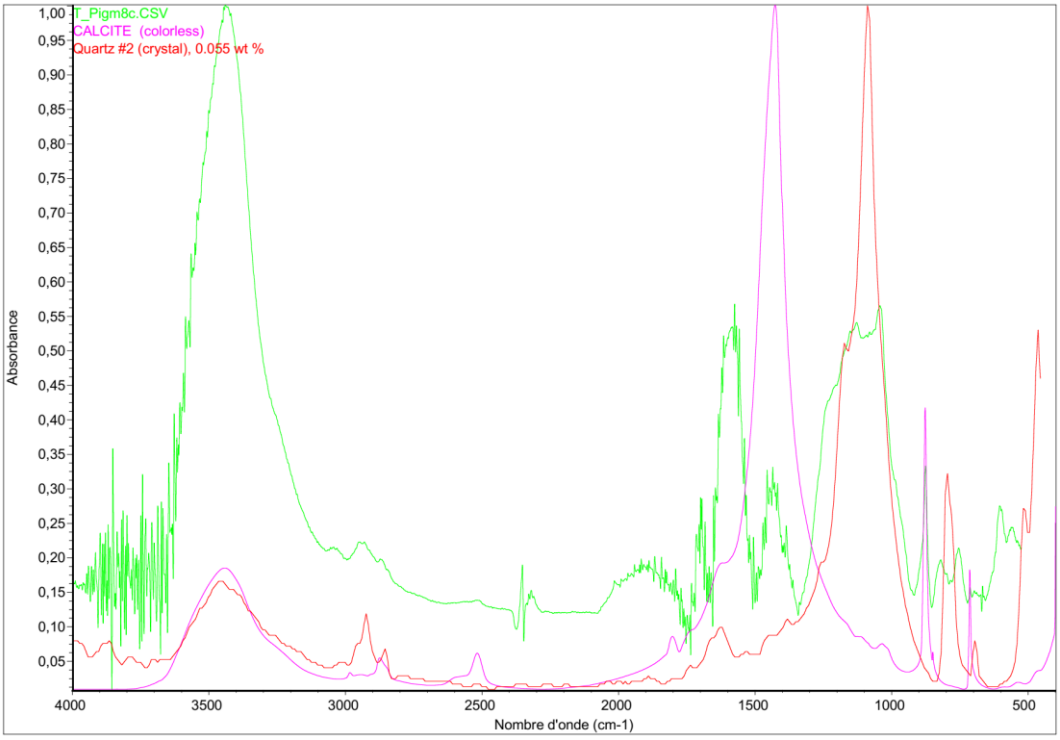
P35 XRD

Table 6

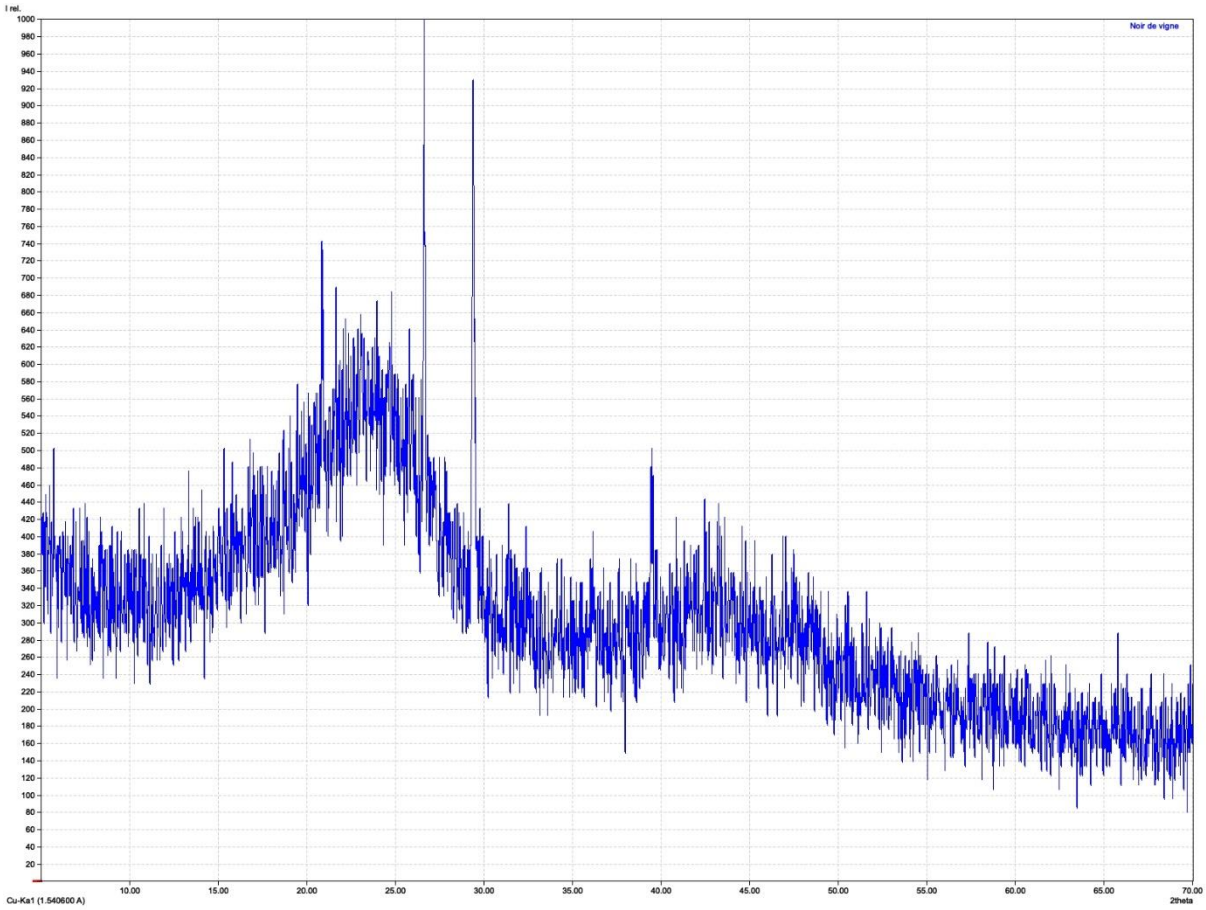
P8 Noir de vigne



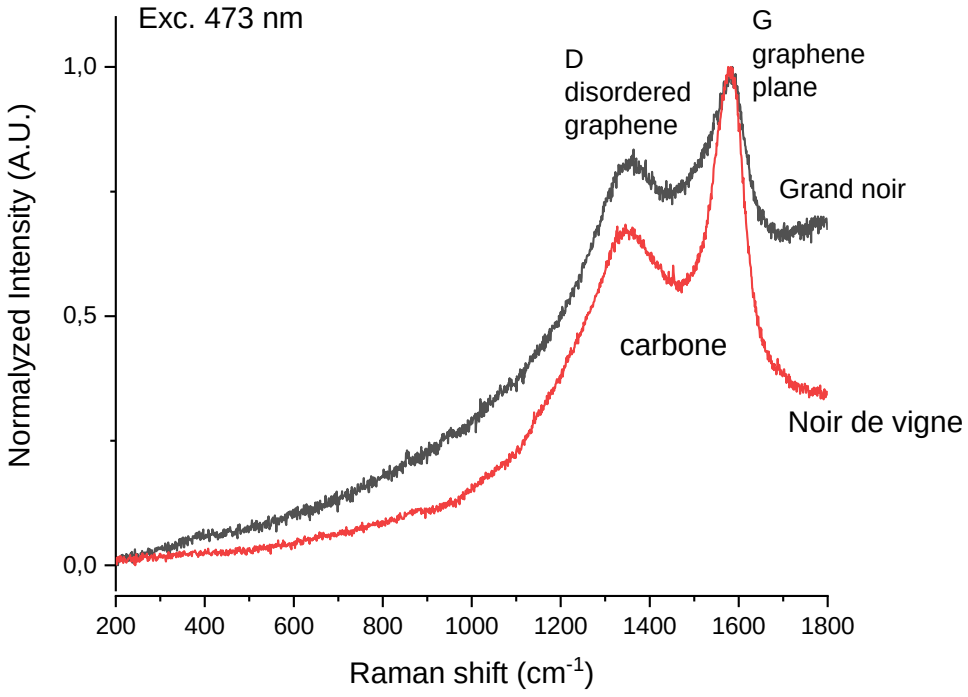
Pigment n°8 #225 Noir de vigne XRF



P8 FTIR

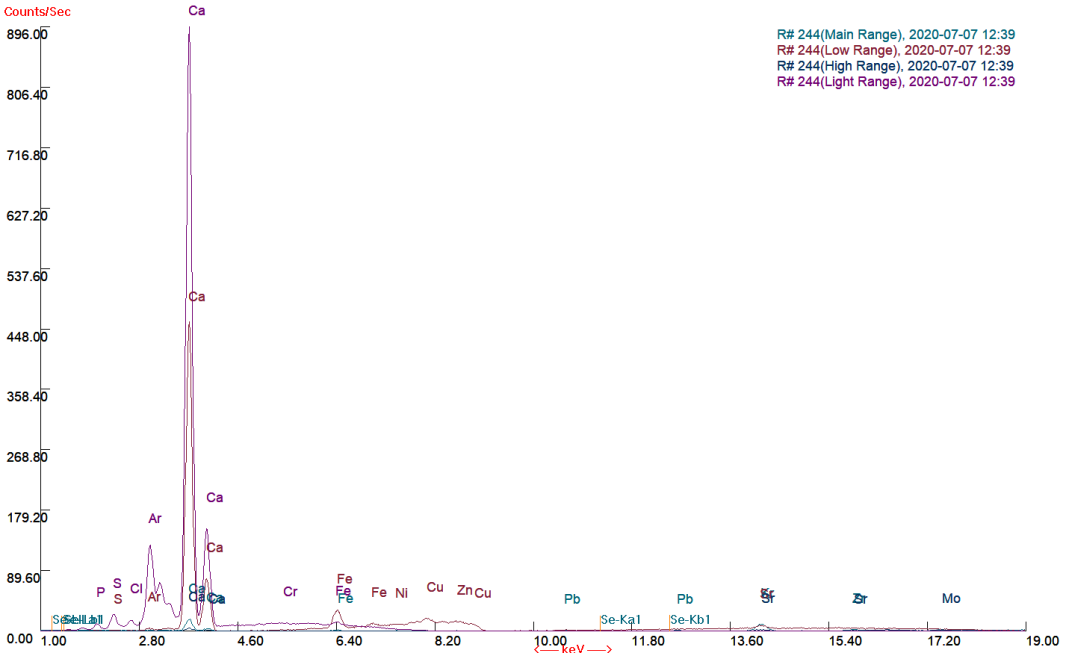


P8 XRD

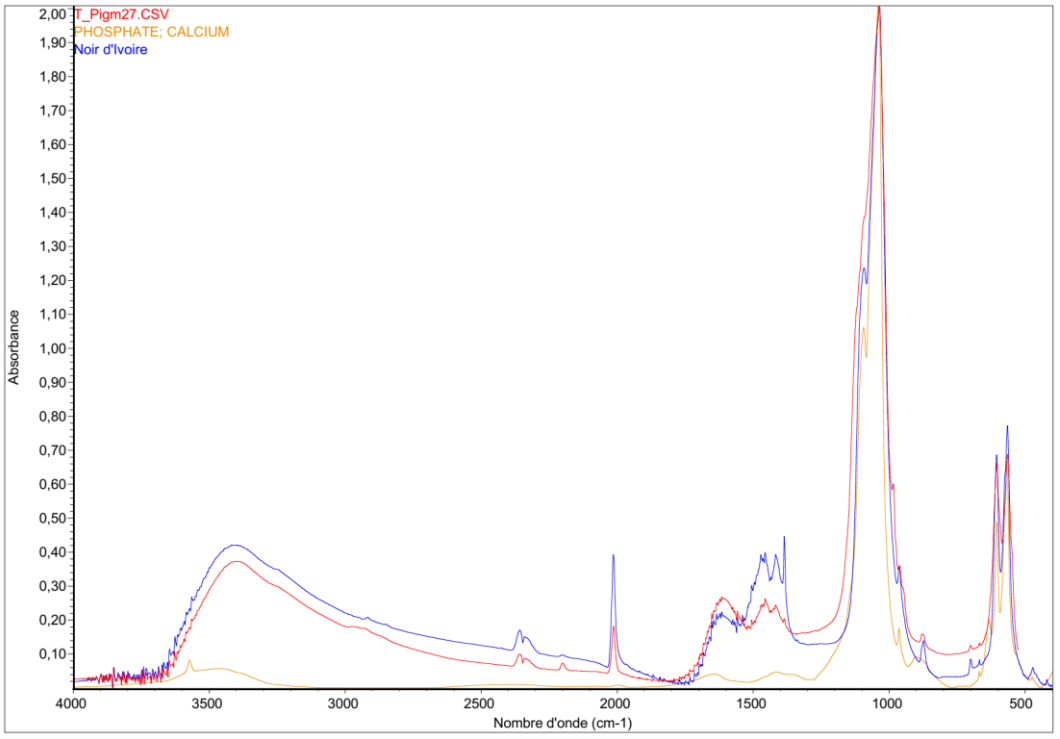


P8 Raman (compared to Grand noir pigmented powder)

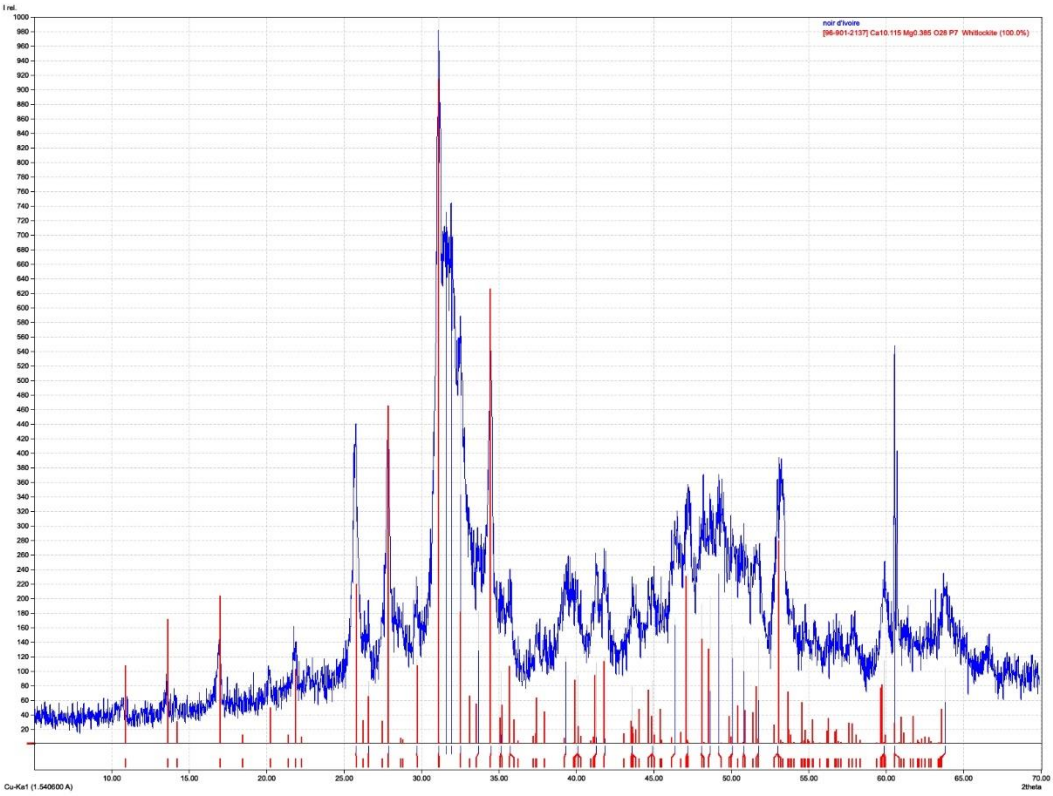
P27 Noir d'ivoire



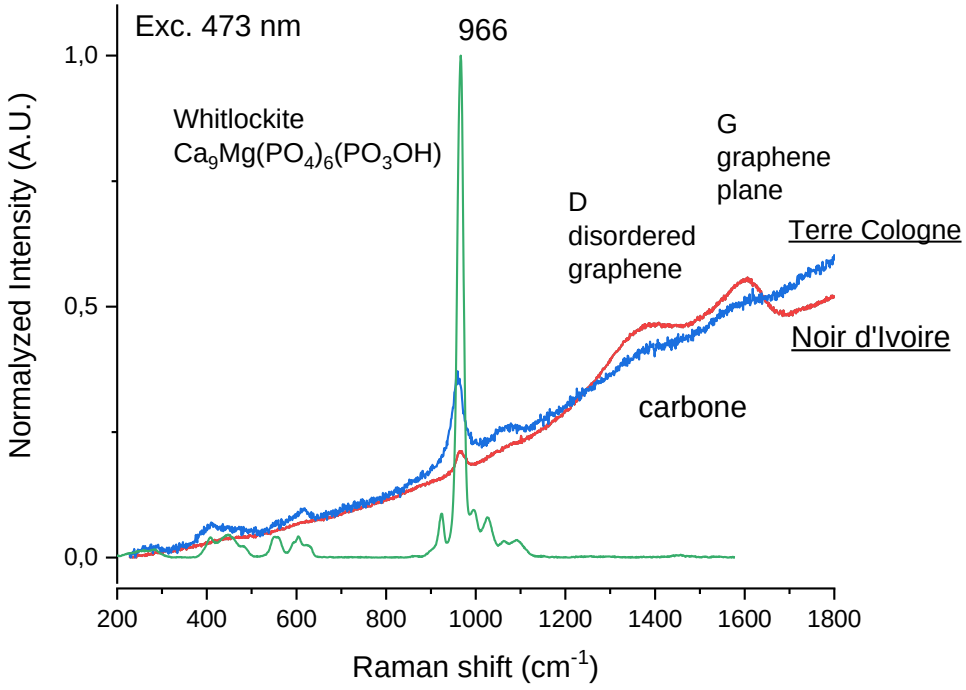
Pigment n°27 #244 Noir d'ivoire XRF



P27 FTIR

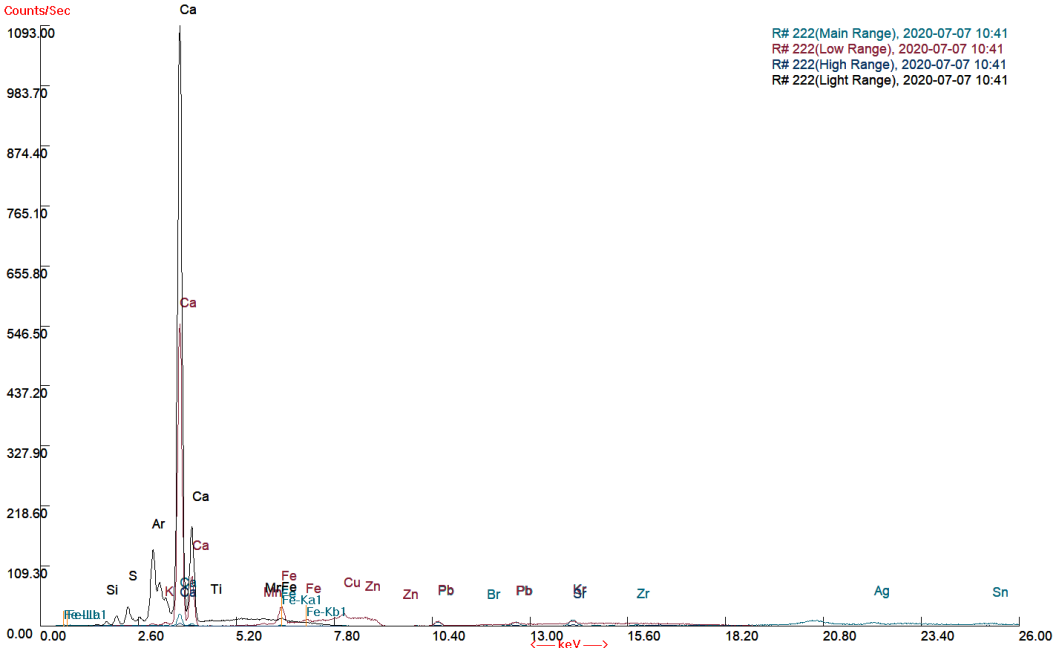


P27 XRD

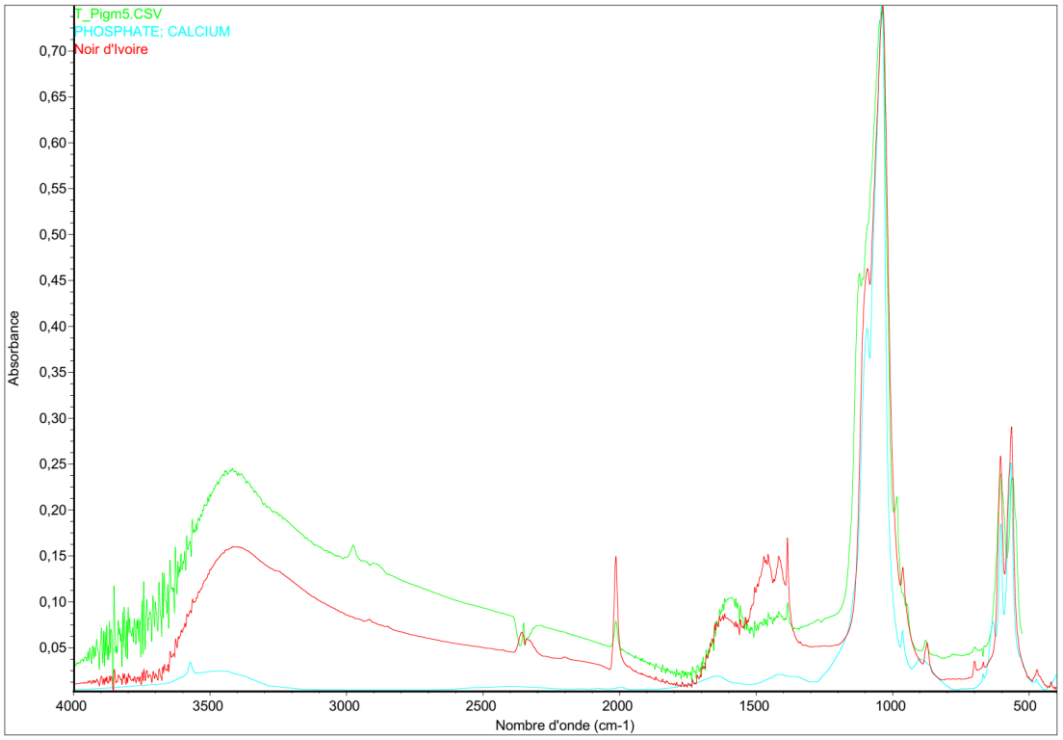


P27 Raman (compared to the Terre de Cologne pigmented powder and to whitlockite reference)

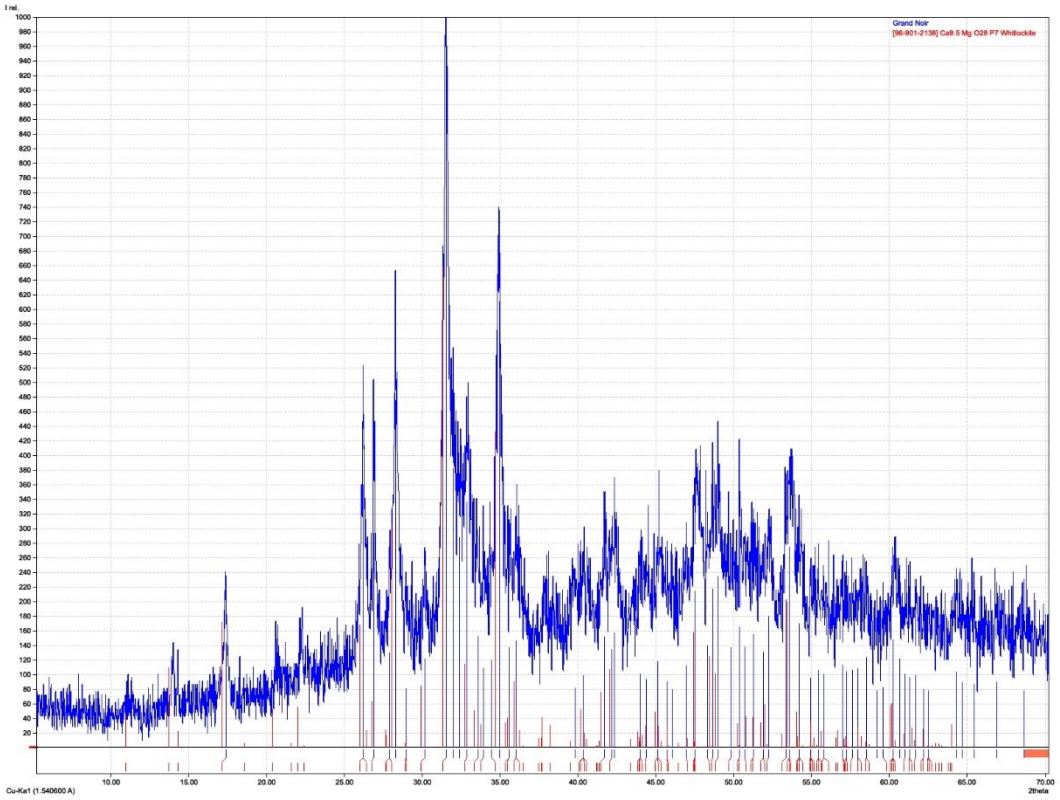
P5 Grand noir



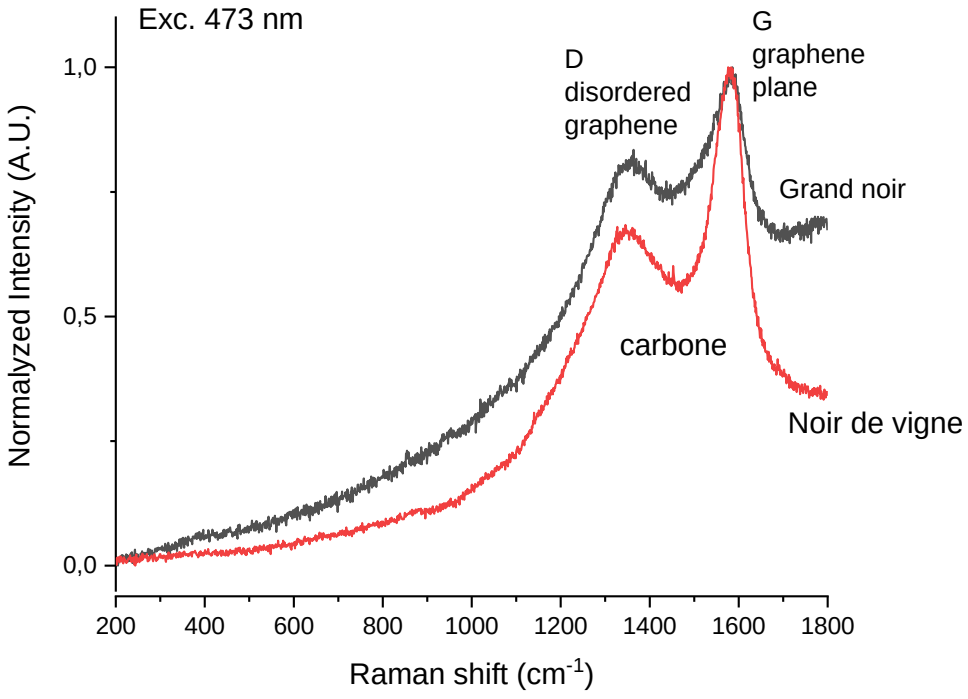
Pigment n°5 #222 Grand noir XRF



P5 FTIR

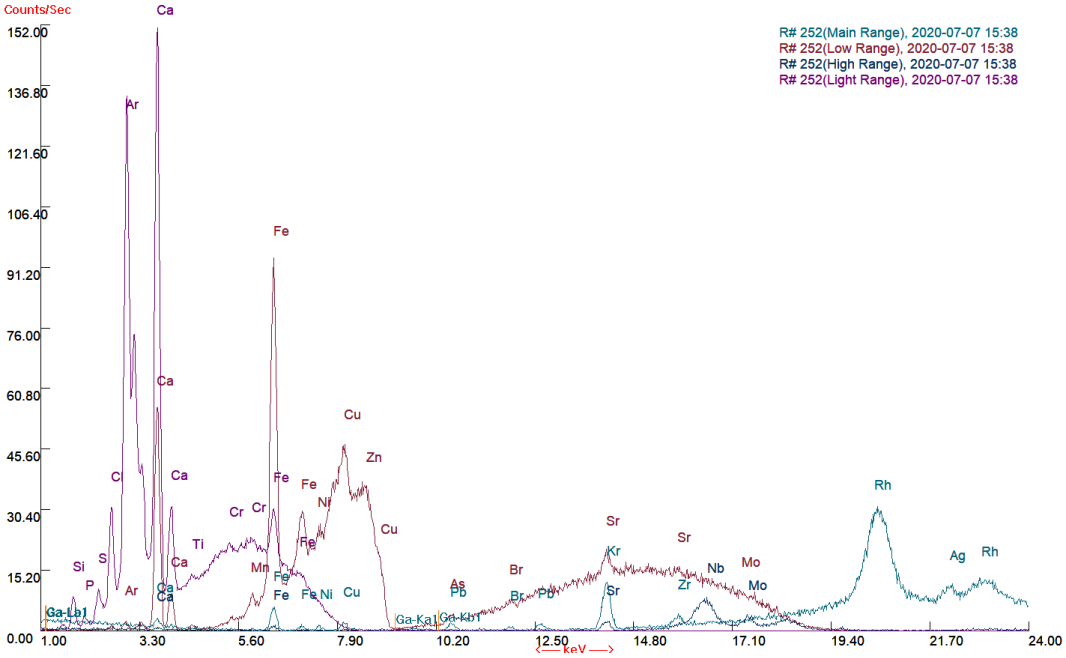


P5 XRD

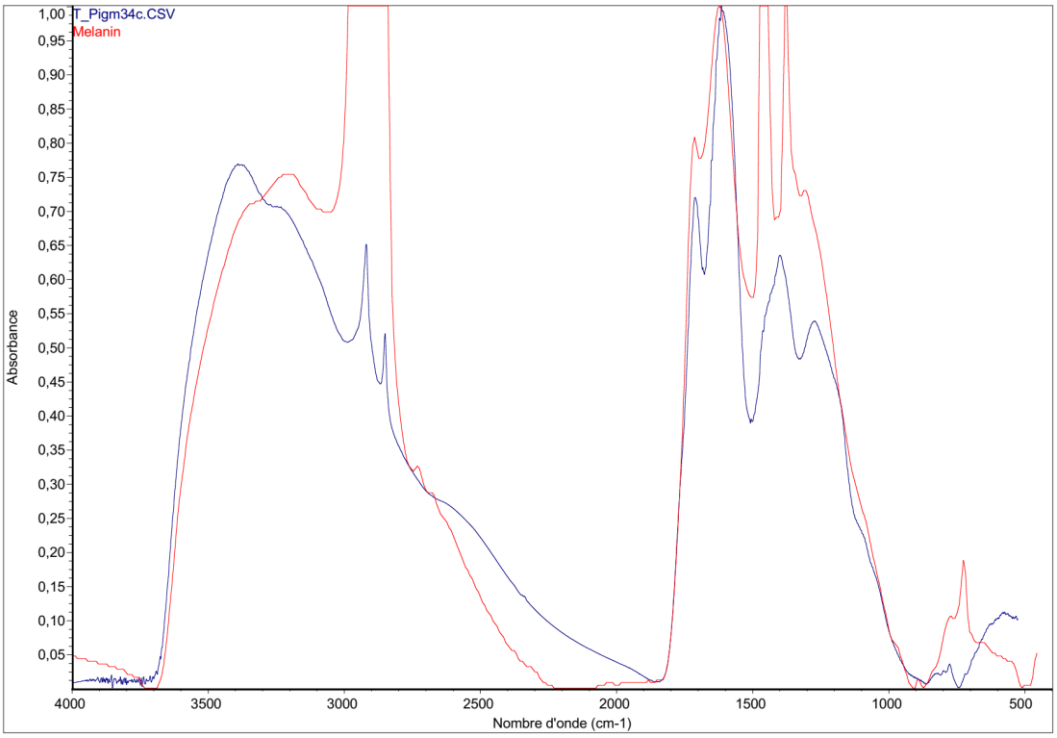


P5 Raman (compared to Noir de vigne pigmented powder)

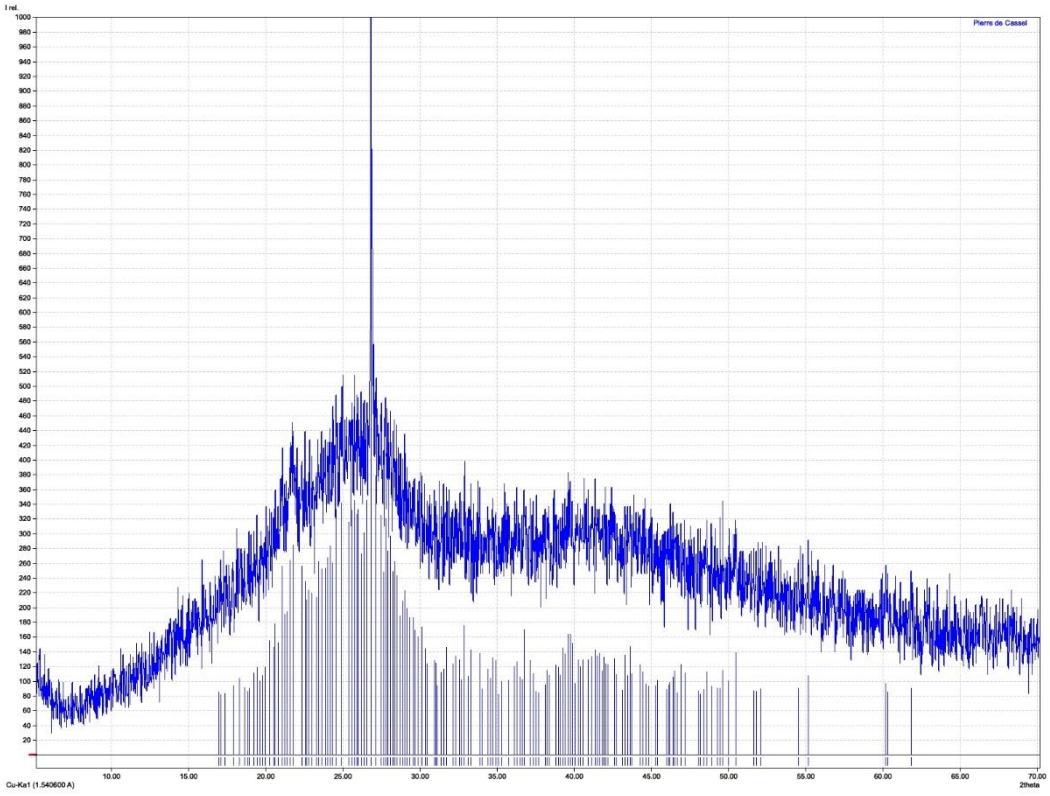
P34 Pierre de Cassel



Pigment n°34 #252 Pierre de Cassel XRF

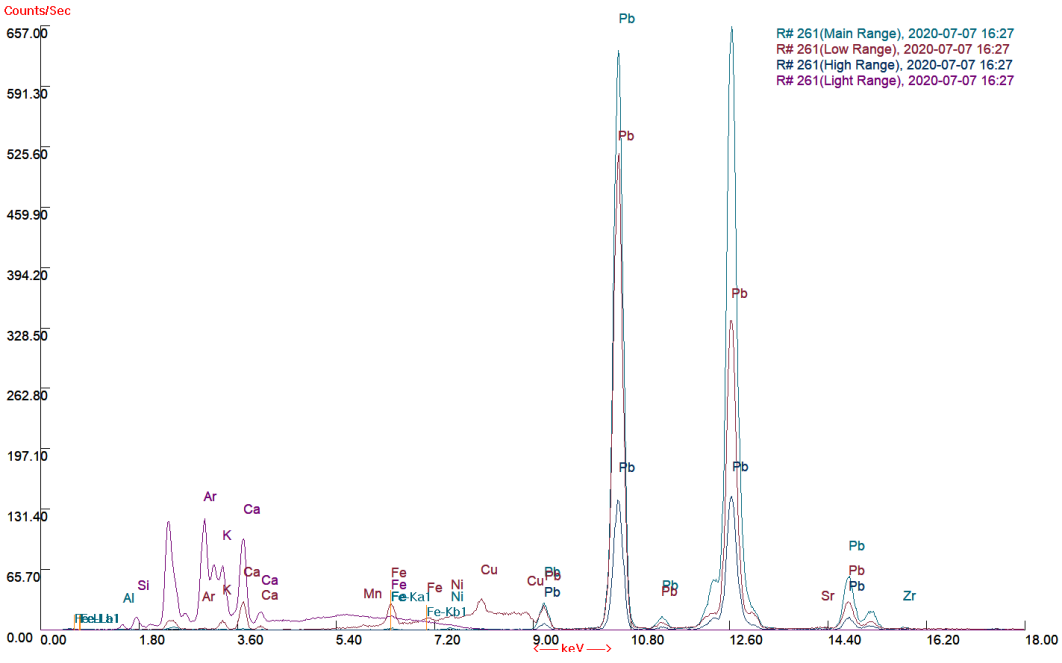


P34 FTIR

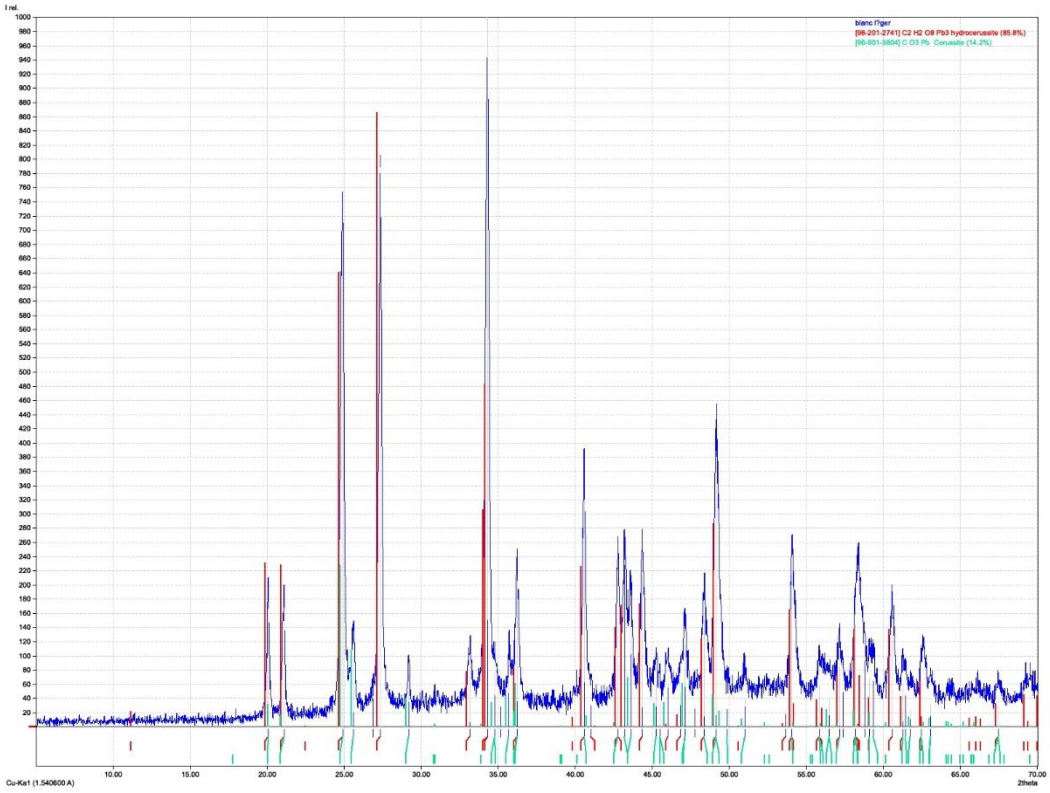


P34 XRD

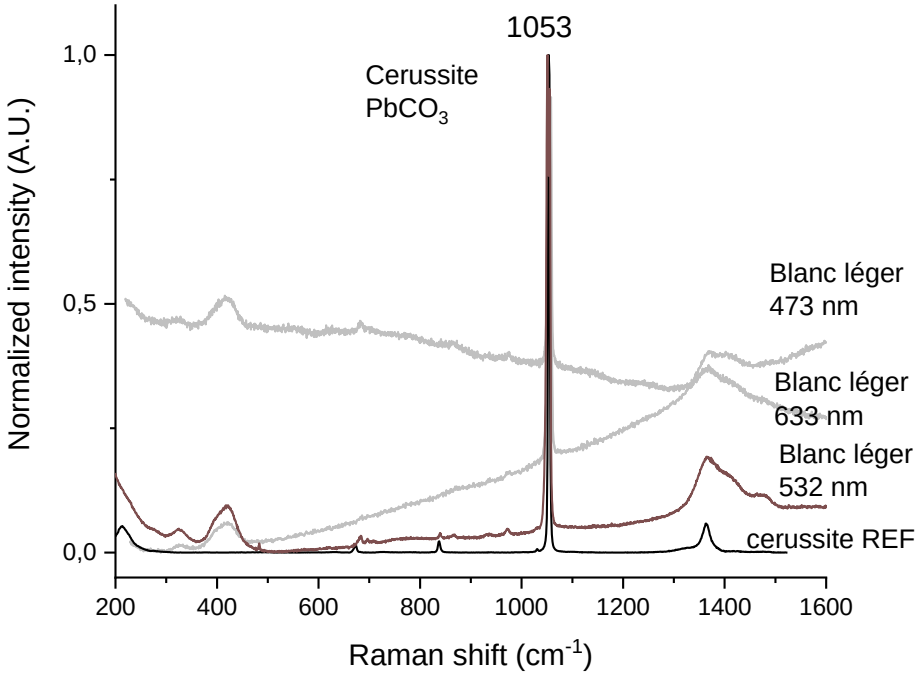
P42 Blanc léger



Pigment n°42 #261 Blanc léger XRF

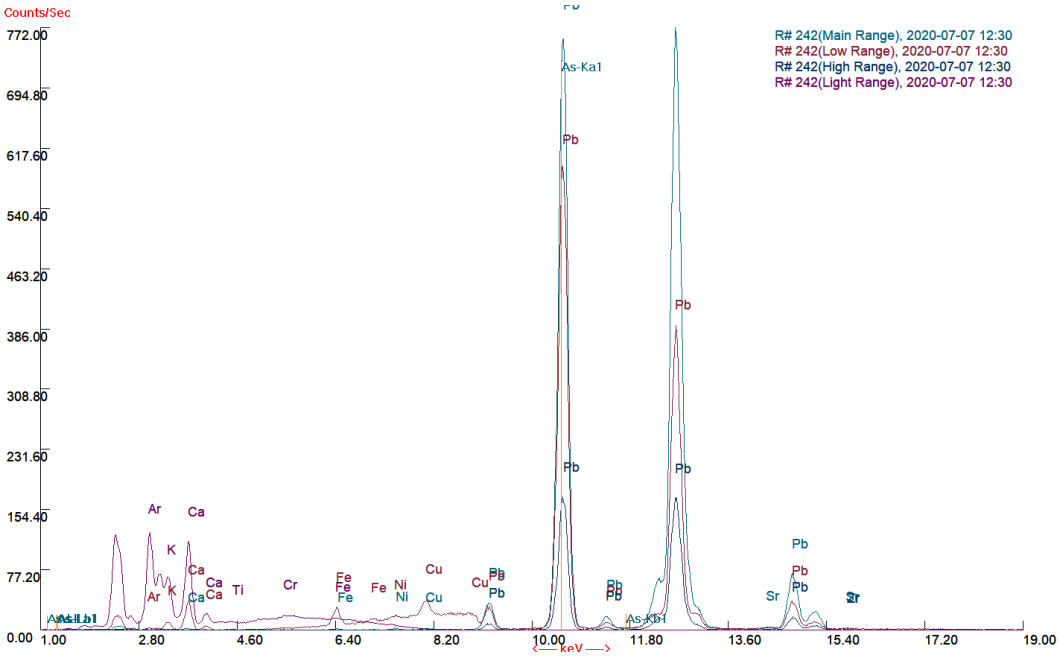


P42 XRD

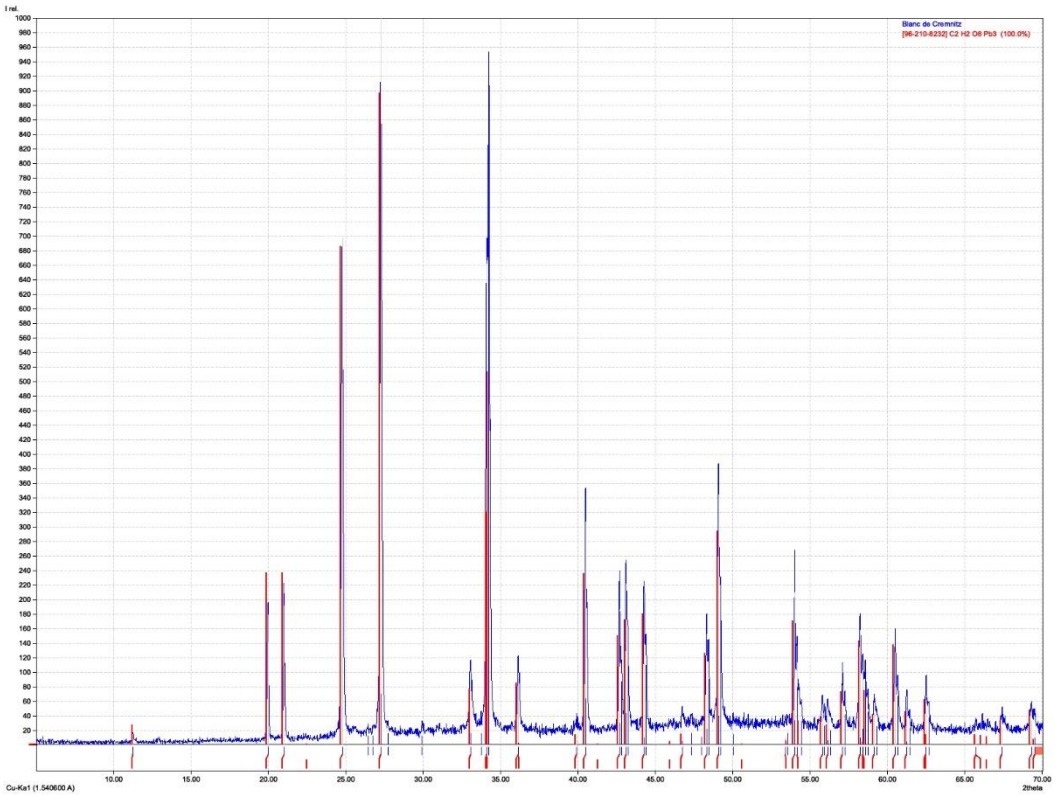


P42 Raman (under various excitations)

P25 Blanc de Cremnitz

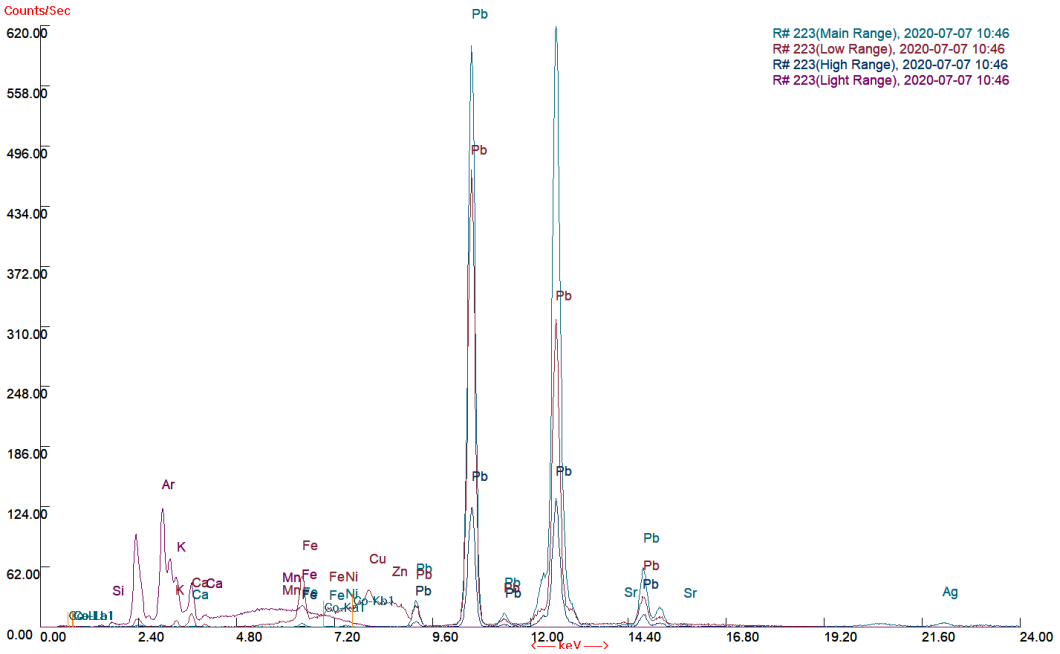


Pigment n°25 #242 Blanc de Cremnitz XRF

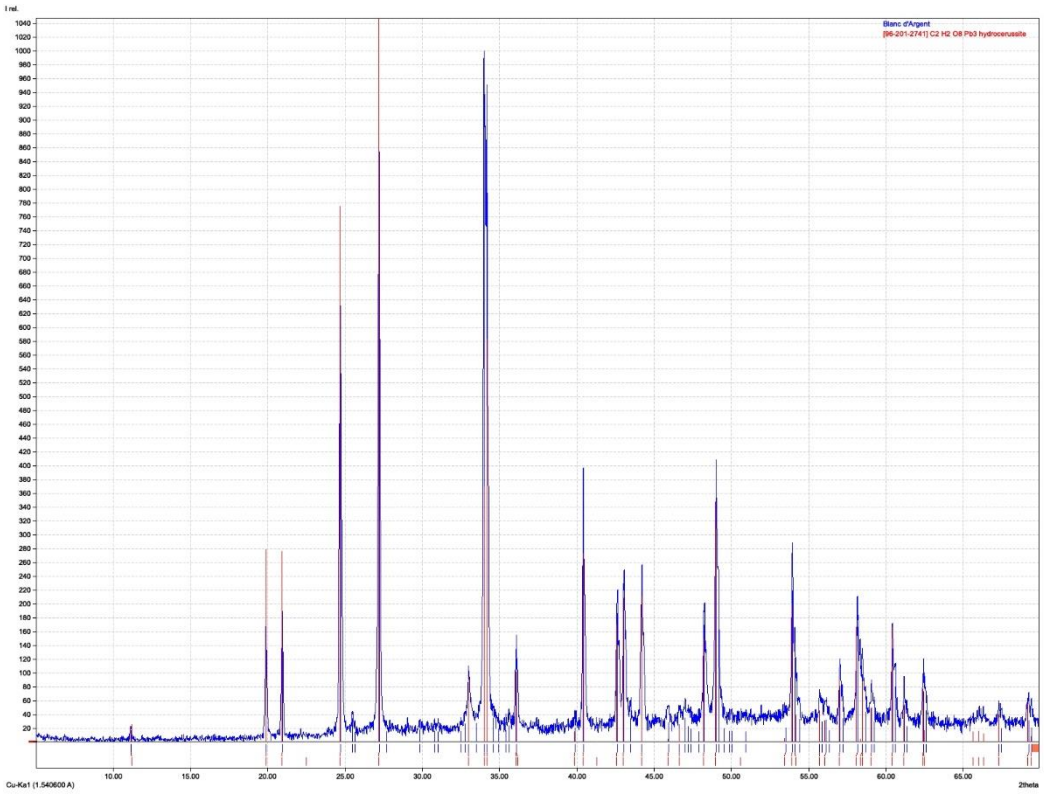


P25 XRD

P6 Blanc d'argent

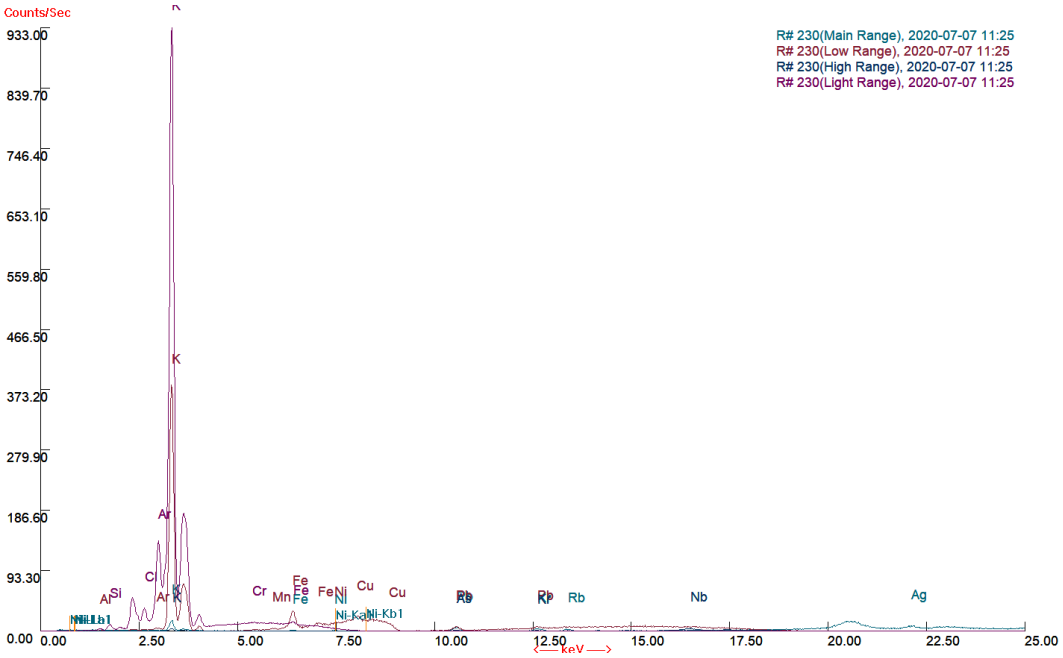


Pigment n°6 #223 Blanc d'argent XRF

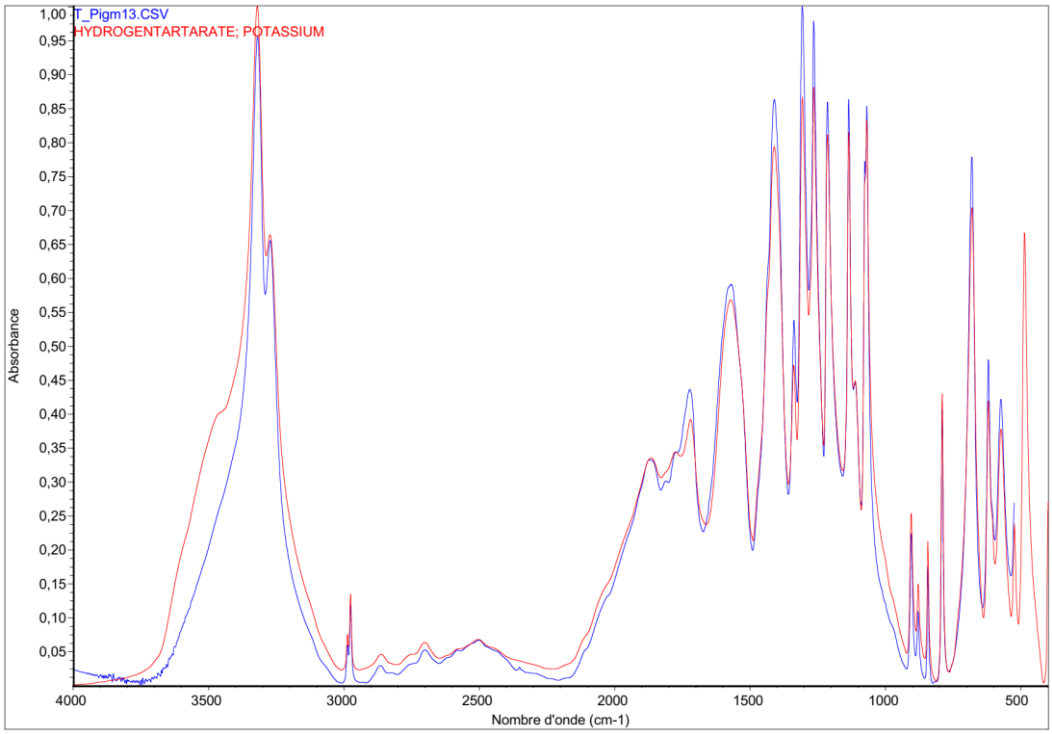


P6 XRD

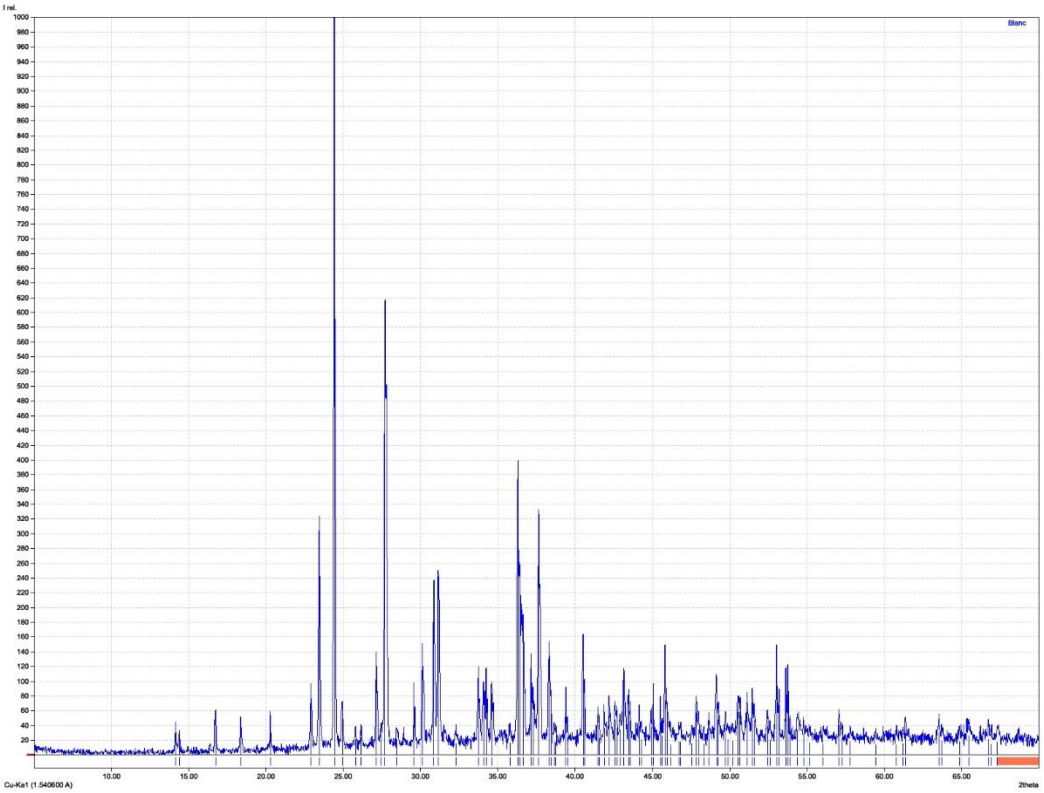
P13 Blanc



Pigment n°13 #230 Blanc XRF

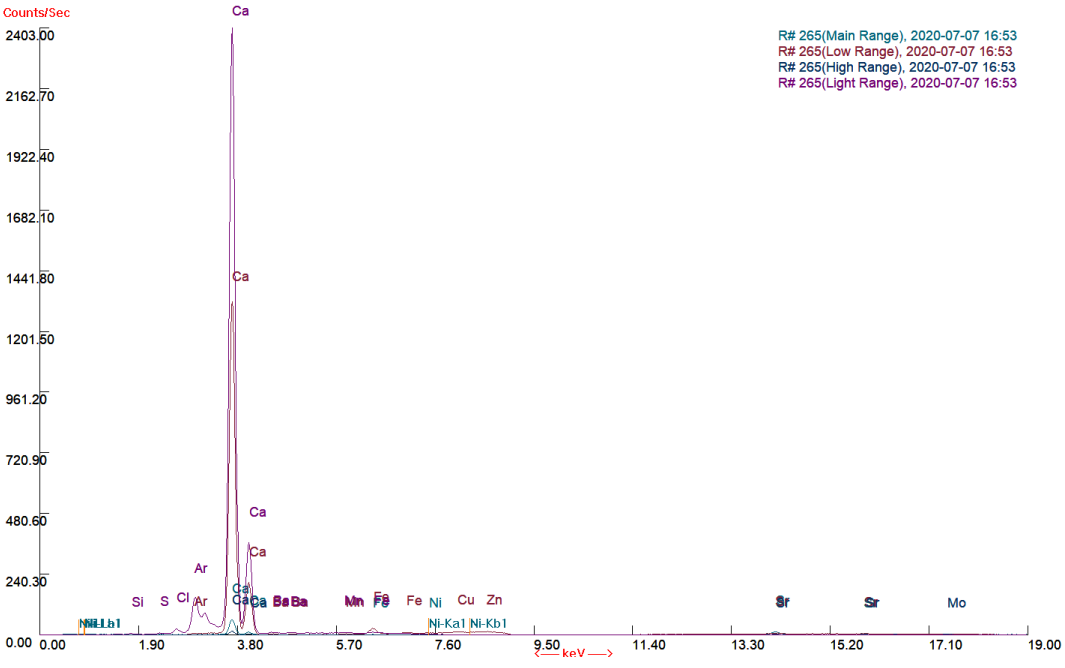


P13 FTIR

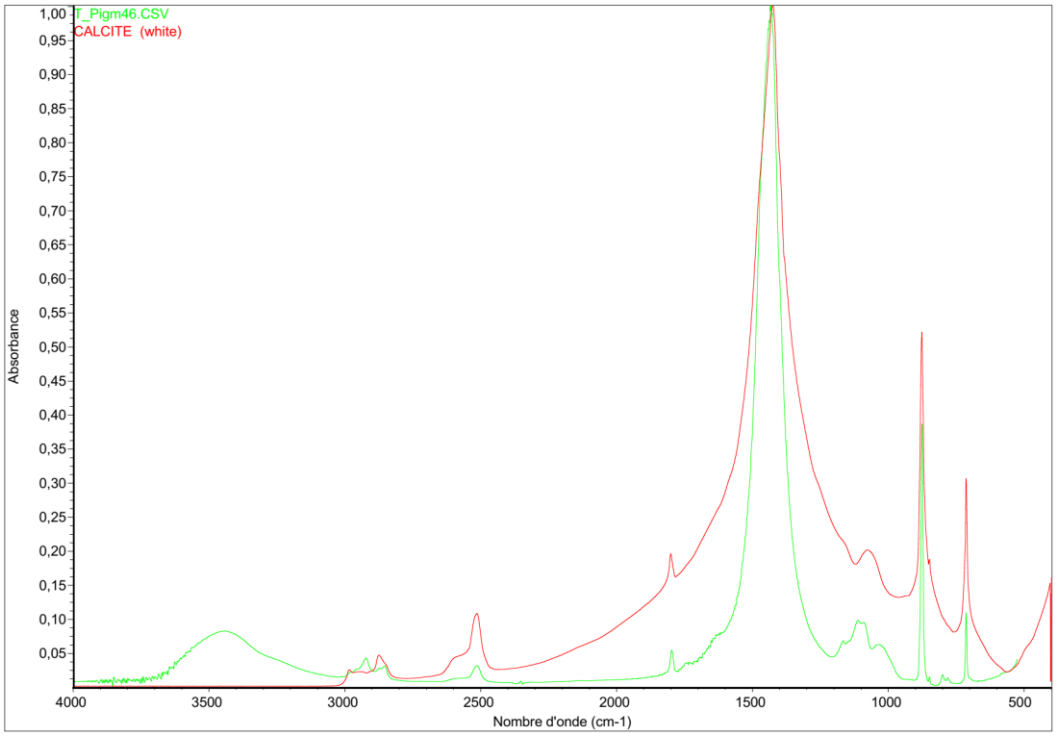


P13 XRD

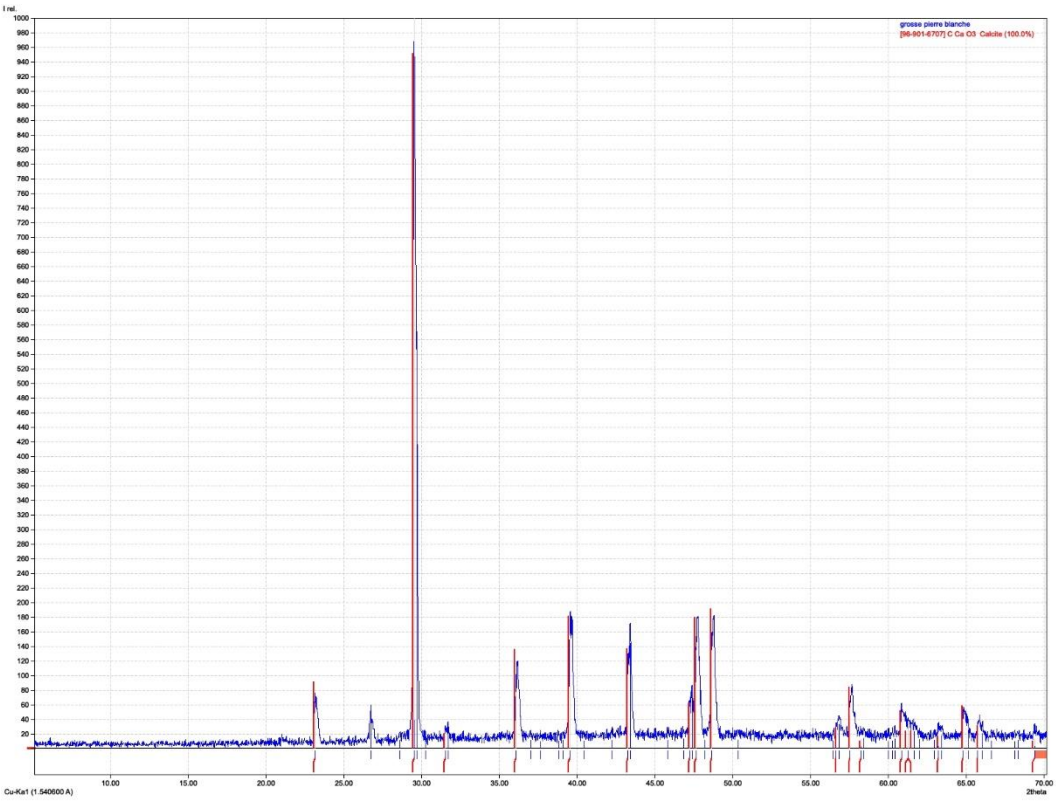
P46 Grosse pierre blanche



Pigment n°46 #265 Grosse pierre blanche XRF



P46 FTIR



P46 XRD

SI2 : Colorimetric index measurements

Colorimetric index measurements of Raw pigmented powders :

Name	L*	a*	b*	Indication in Figure 9
Yellow and orange pigmented powders				
Laque de Gaude	84 ± 3	84 ± 1	6 ± 1	(a)
Laque Jaune	76 ± 2	72 ± 1	14 ± 1	(b)
Jaune clair n°1	135 ± 4	89 ± 1	-1 ± 1	(c)
Petite pierre jaune	89 ± 3	-1 ± 1	46 ± 1	(d)
Jaune de Vienne	87 ± 2	1 ± 1	73 ± 1	(e)
Crôme Citron	88 ± 3	1 ± 1	70 ± 1	(f)
Pierre Jaune	72 ± 3	19 ± 1	53 ± 1	(g)
Ocre Jaune	53 ± 2	22 ± 1	55 ± 1	(h)
Ocre de Rue (or Ru)	72 ± 2	26 ± 1	56 ± 1	(i)
Jaune Marron	55 ± 2	42 ± 1	54 ± 1	(j)
Orpin jaune	91 ± 3	-1 ± 1	62 ± 1	(k)
Sans nom 'marron'	55 ± 2	35 ± 1	51 ± 1	(l)
Crôme orange	86 ± 3	5 ± 1	71 ± 1	(m)
Cadmium	67 ± 2	29 ± 1	61 ± 1	(n)
Sans nom 'orange	67 ± 2	29 ± 1	48 ± 1	(o)
Red pigmented powders				
Laque de Garance Pour M^{er}	27 ± 2	42 ± 1	32 ± 1	(a)
Galet rouge	47 ± 2	50 ± 1	39 ± 1	(b)
Laque magnifique	41 ± 2	60 ± 1	43 ± 1	(c)
Brun Rouge d'angleterre d'Antheaume	33 ± 3	50 ± 1	41 ± 1	(d)
Rouge Mars	29 ± 2	45 ± 1	41 ± 1	(e)
Vermillon	47 ± 2	61 ± 1	43 ± 1	(f)
Vermillon de Chine	39 ± 2	57 ± 1	47 ± 1	(g)
Blue pigmented powders				
Bleu de Vienne	40 ± 2	19 ± 1	-51 ± 1	(a)
Sans nom bleu	22 ± 2	-2 ± 1	-23 ± 1	(b)
Bleu de Prusse	5 ± 2	4 ± 1	-15 ± 1	(c)
Bleu minéral	17 ± 2	4 ± 1	-27 ± 1	(d)
Bleu de Ciel	34 ± 2	-4 ± 1	-23 ± 1	(e)
Laque Bleue de Garance inaltérable	35 ± 2	-5 ± 1	-23 ± 2	(f)
Cobalt	40 ± 2	8 ± 1	-30 ± 1	(g)
Green pigmented powders				
Sans nom vert	59 ± 2	-49 ± 1	20 ± 1	(a)
Vert de Scheele	63 ± 4	-22 ± 1	21 ± 1	(b)
Sans nom vert foncé	18 ± 2	-7 ± 1	13 ± 1	(c)
Brown pigmented powders				
Momie	25 ± 2	19 ± 1	22 ± 1	(a)
Terre de Cologne (Mr. Dechazelle)	18 ± 2	21 ± 1	19 ± 1	(b)
Terre de Sienne brulée Antheaume	25 ± 2	37 ± 1	32 ± 1	(c)
Couleur d'Appiani	35 ± 3	32 ± 1	36 ± 1	(d)

Colorimetric index measurements of different area on pictural layer :

Area in Picturial layer	L*	a*	b*
Painting *Princess Elizabeth, sister of King Louis XVI, distributing milk*			
A1	48 ± 3	8 ± 2	-14 ± 2
A2	6 ± 3	5 ± 2	-1 ± 1
A3	12 ± 3	-1 ± 1	-1 ± 1
A4	18 ± 3	36 ± 2	23 ± 2
A5	27 ± 3	34 ± 2	33 ± 2
A6	18 ± 3	38 ± 2	23 ± 2
A7	23 ± 3	45 ± 2	31 ± 2
A8	57 ± 3	26 ± 2	64 ± 2
A9	55 ± 3	24 ± 2	62 ± 2
A10	61 ± 4	50 ± 2	18 ± 2
Painting *Henri IV at Gabrielle d'Estrées*			
B1	16 ± 3	37 ± 2	22 ± 2
B2	15 ± 3	34 ± 2	17 ± 2
B3	29 ± 3	-26 ± 2	25 ± 2
B4	21 ± 3	-23 ± 2	23 ± 2
Painting *The Painter and his family*			
C1	39 ± 3	-14 ± 2	17 ± 2
C2	31 ± 3	-10 ± 2	11 ± 2
C3	45 ± 4	56 ± 2	45 ± 2
C4	35 ± 3	45 ± 2	34 ± 2