

## **Supplementary Materials**

# **Non-invasive on-site classification and dating of ancient ceramics through pXRF and Raman analysis of marks, glaze and overglaze. Application to 18th and 19th century Meissen porcelain (Saxony) and comparison with Chinese porcelain**

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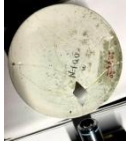







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**Table S1** : Analyzed artefacts : date of production and acquisition (MNR: *Musées Nationaux Récupération*, <https://www.culture.gouv.fr/Nous-connaître/Organisation-du-ministère/Le-secretariat-général/Mission-de-recherche-et-de-restitution-des-biens-culturels-spoliés-entre-1933-et-1945/Biens-Musees-Nationaux-Recuperation-MNR>); (in red, Raman study only)

Inventory number (Type)	Period (expected)	View	Size (cm) Lxl;H	Origin (Date of acquisition)
MNC 2274.38 (Figure)	1709-1730		8.7x8.8;14	Dresden museum coll. (exchange, 1837)
MNC 469.11.1 (tea cup)	ca. 1720-1725		10x8;7	(purchase, 1807)
MNC 8160.2 (dish)	ca. 1720		12x12;2.7	Lugel-Dolfus coll. (gift, 1882)
MNC 2274.9 (bowl)	1726 (mark)		12x6	Dresden museum coll. (exchange, 1837)
MSCR XXXXV (Imari-style dish)	ca. 1730		22x22;3	MNR (1949)
MCSR LXXIX (large tureen)	ca. 1720-1730		20.4;7.3	MNR (1949)
MNC 19014 (coffee cup with arm coat of France and Poland)	1737 Gift from August IIIrd to Marie Leszcynska		6;5.3	Armand Wittekind coll. (1936)
MSCR LVII.1 (coffee cup with Watteau-like décor)	ca. 1745		6;8.8	MNR (1949)
MNC 8322	ca. 1740-1760		24.4x11.3;10.3	Villaire coll. (purchase 1884)

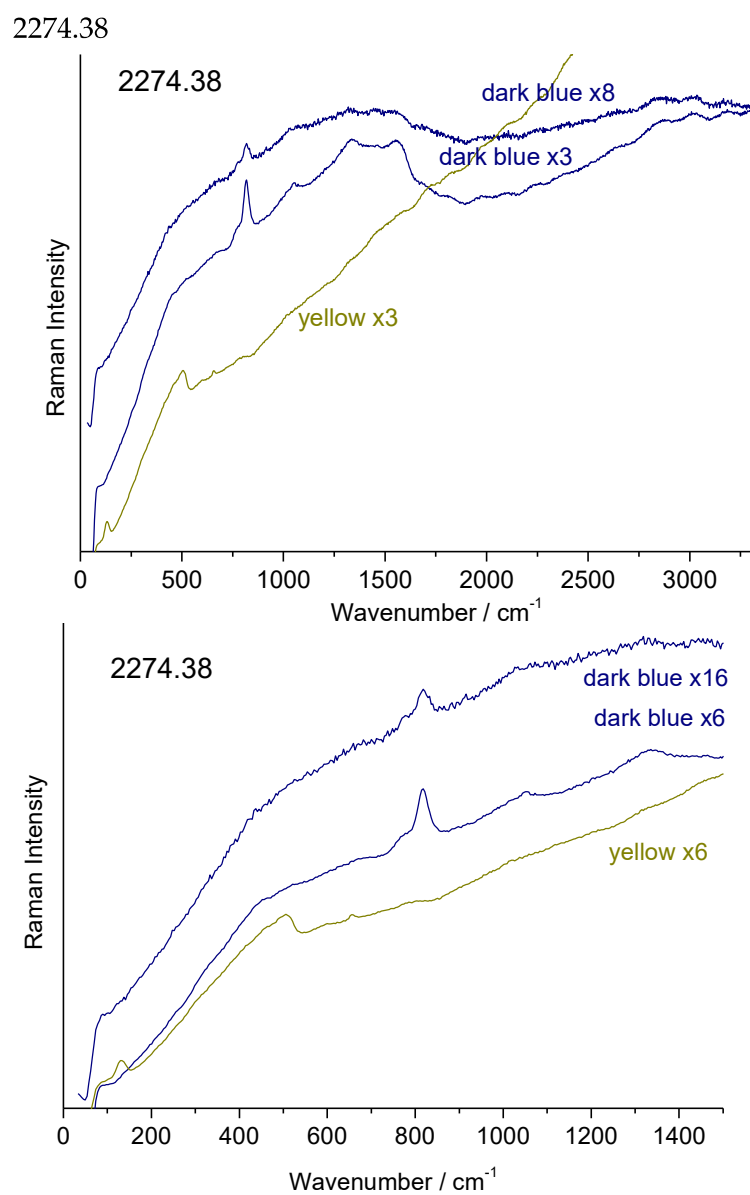
MNC 23181 (Louis XV figure)	1746 (wedding of France Dauphin and M.-J. de Saxe)		13x15;16.2	Anne-Jules Noailles coll (gift, 1963)
MNC 11205 (Bacchus & bacchante group)	Käendler period ca. 1760		25x19.5;27.2	Eléonor Dècle coll. (gift 1902)
MNC 2274.20 (butter cup)	18 <sup>th</sup> c.? 		13x13.5;7	Dresden museum coll. (exchange, 1837) W mark Cluny museum coll.
MNC 19032.2 (mustard cup)	18 <sup>th</sup> c.		9.3;7.7	
MNC 14229.1 (chocolate pot)	18 <sup>th</sup> c.		13x7;9.7	Antoine- Gaston de Grollier coll. (bequest 1908)
MNC 11213.2 (coffee cup)	18th c.		7.7x6;3.7	Eléonor Dècle coll. (gift 1902)
MNC 14234 (orange cup)	18th c. ? 		8.4x8.4;10	Antoine- Gaston de Grollier coll. (bequest 1908)
MNC 11051.2 (boy figure)	18th c. ?		5.4x4.7;12.2	Eléonor Dècle coll. (gift 1902)

MNC 11064 (Three geometer and astronomer children group)	18th c.?		9.4x8.8;12.2	Eléonor Dècle coll. (gift 1902)
MNC 19944 (singing angel)	18th c.		4.6x4.1;8.3	Cluny museum coll. (1938)
MNC 9638 (bowl)	18th c.		21.8x21.8;10.3	Tamelier coll. (purchase 1894)
MNC 14201 (teapot)	18th c.		9.4;9.4	Antoine- Gaston de Grollier coll. (bequest 1908)
MNC 23298.1 (cup for Turkish market)	ca. 1774-1814		12x12;10	Joseph Soustiel coll. (gift 1967)
MNC 469.9.1 (coffee cup with painting copy)	c.a. 1774- 1814 (Marcolini period)		9x6.7;10.5	
MNC 886.4.1 (coffee cup)	End of 18th- beginning of 19th c.?		9x6.5;6.5	
MNC 469.5.1 (coffee cup)	?		8.5x6.5;6.3	
MNC 25340 (figure)	19th c.		13.7x9.3;15.5	Cellier coll. (bequest 1986)



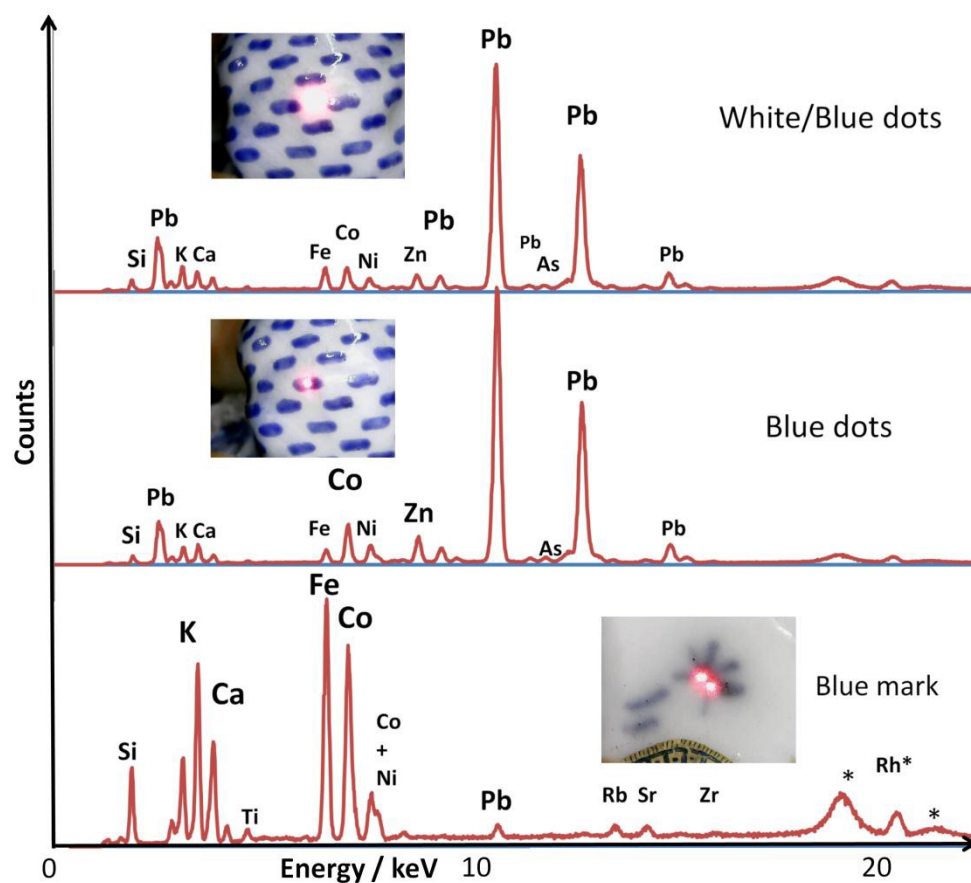
MNC 886.3	1825		24.5x24.5;3.2	M. Kühn gift (1825)
MNC 2247.10 dish				1836

**Figure S1:** As-recorded Raman and pXRF spectra of artifacts

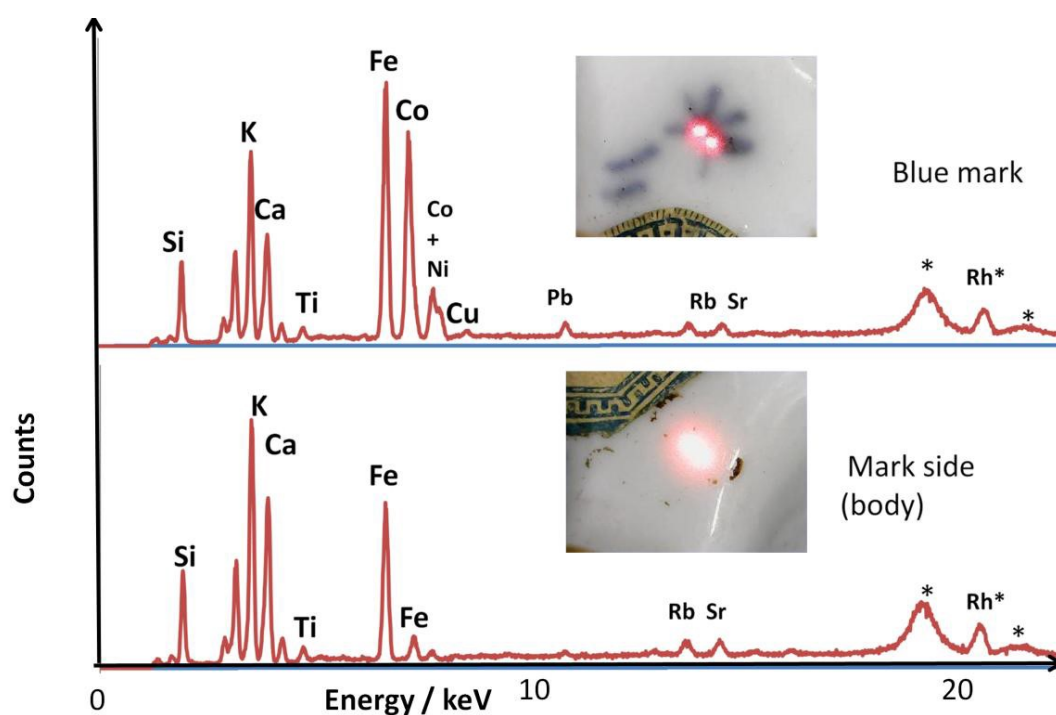


Exchange in 1837 with  
Dresden museum  
1709-1730

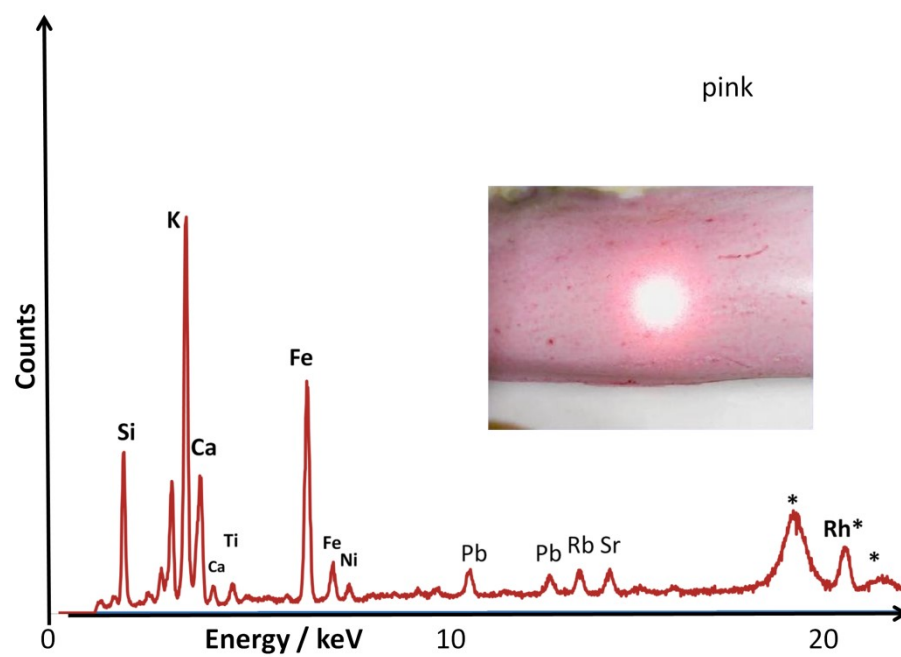
MNC 2274.38  
Figure  
shape 1709  
Pdf?



MNC 2274.38  
Figure  
shape 1709



MNC 2274.38

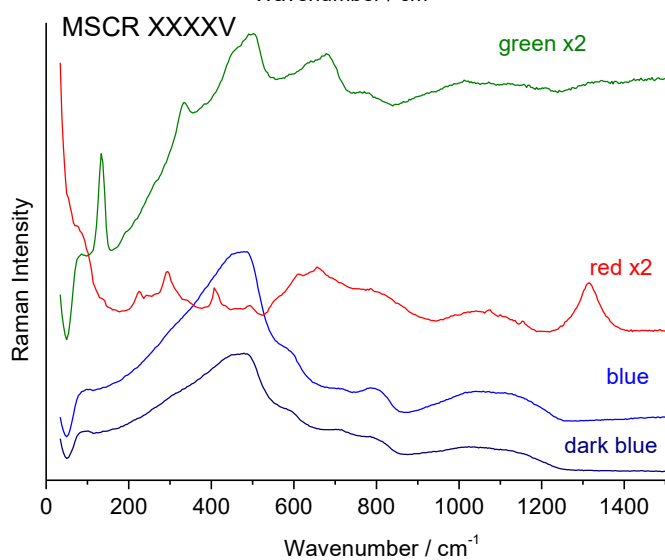
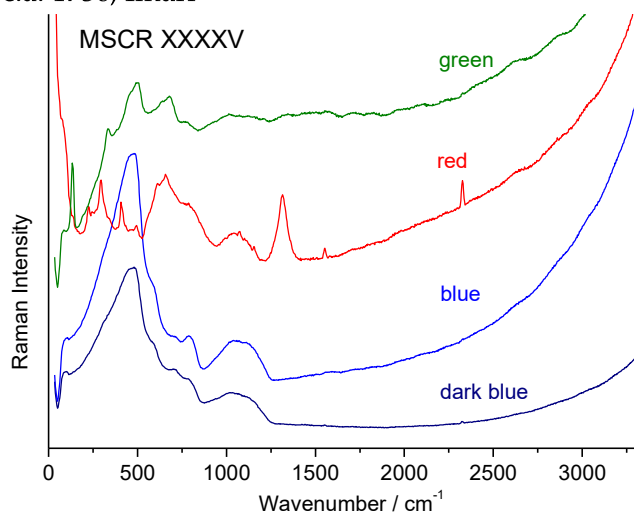


Co-Ni-Cu

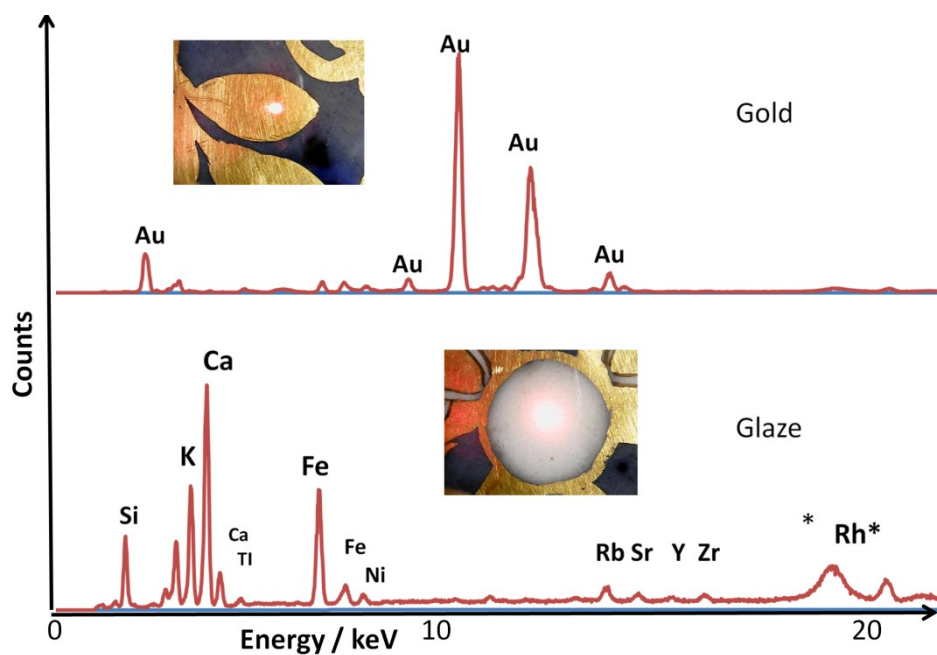
MSCR XXXXV assiette (base MNR, Office de  
Récupération des Biens Privés, 1949)

22x22 H3

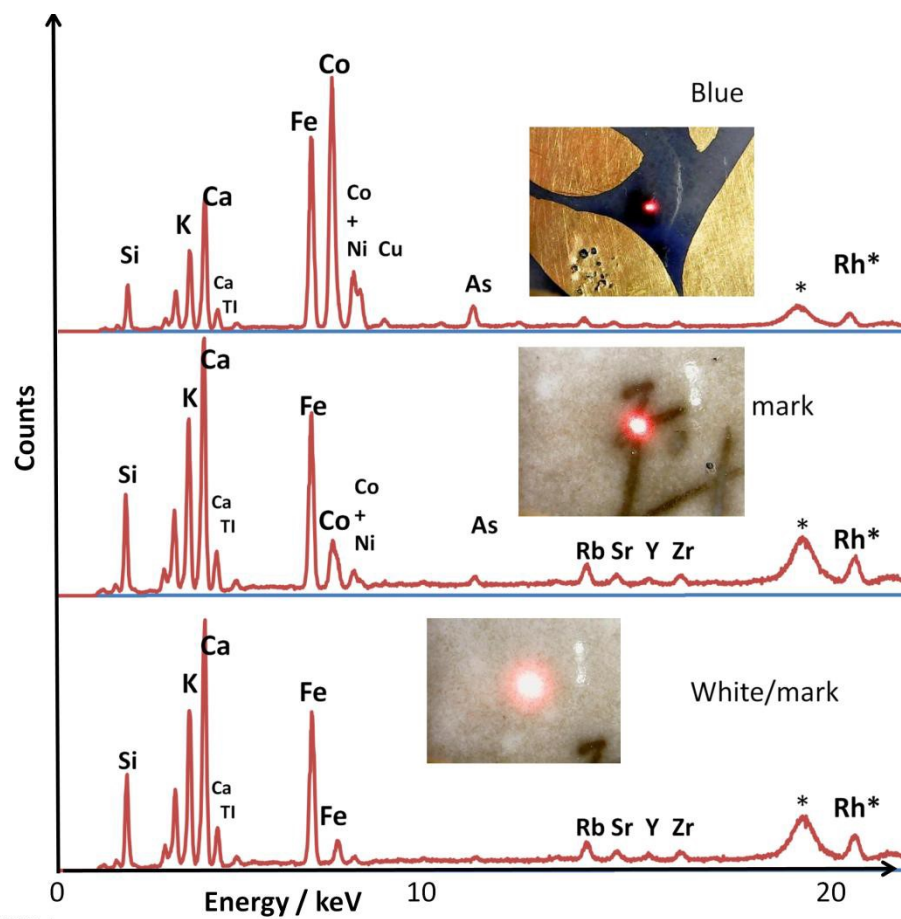
c.a. 1730, Imari

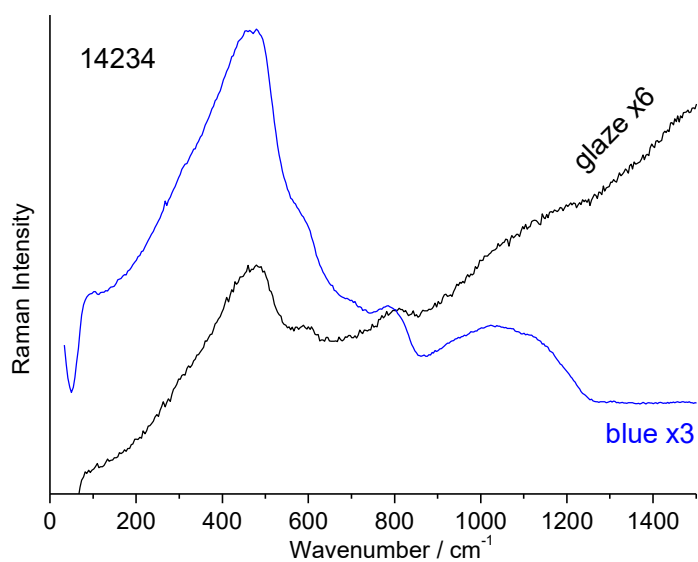
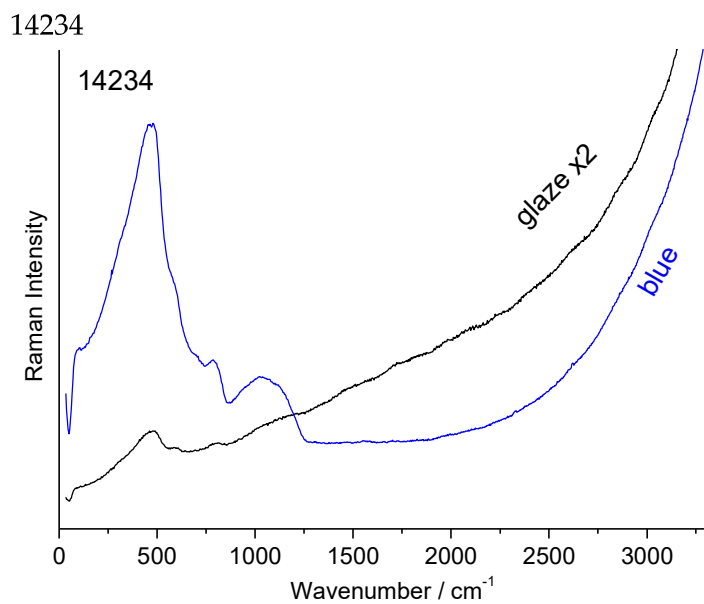


MCSR XXXXV  
(Imari style dish)  
1730



MCSR XXXXV  
(Imari style dish)  
1730

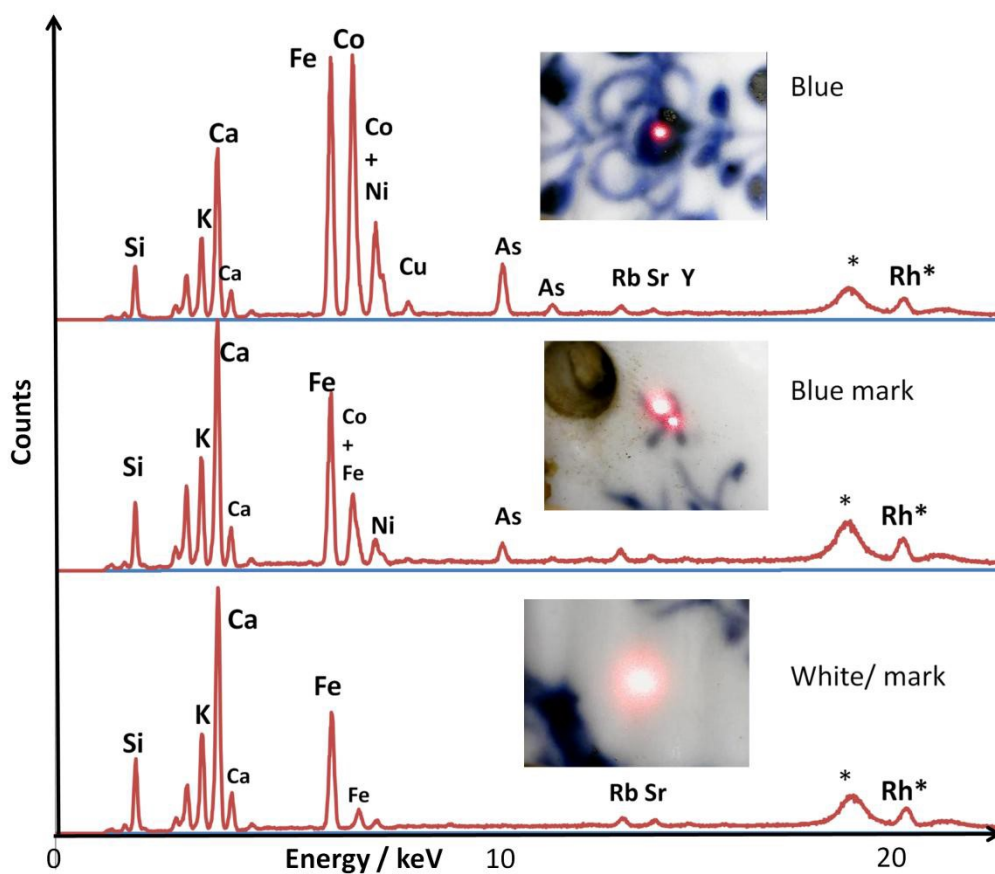




Antoine Gaston de Grollier bequest  
(1908)  
8.4x8.4 h10  
Orange cup  
18th century?



MNC 14234  
(orange cup)



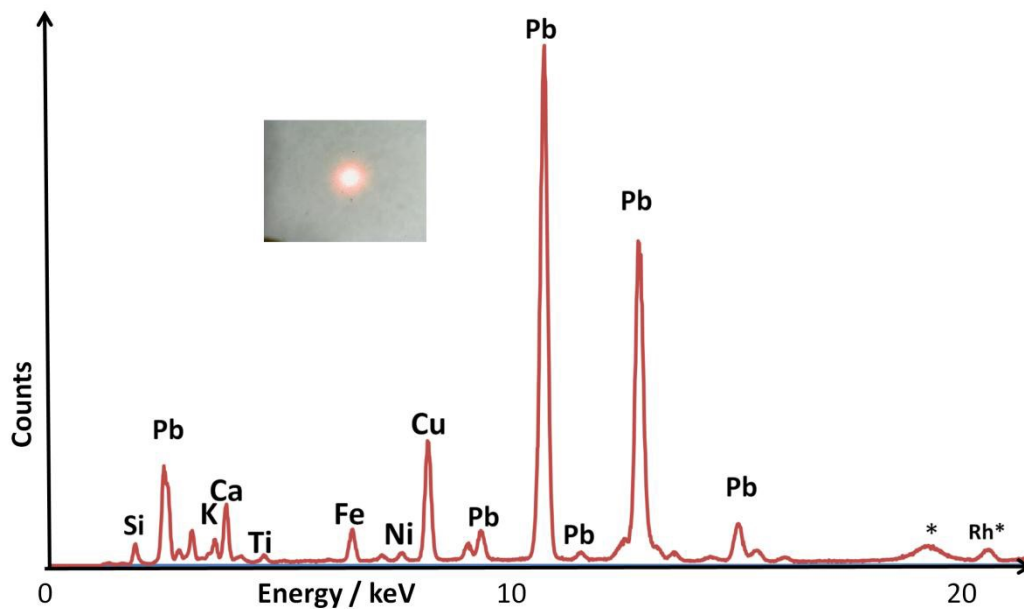
MNC 2274.2 (wrongly labelled 2274.9)

1726

In Porcelaine de Saxe, Exhibition Catalogue , 1952, item N°131

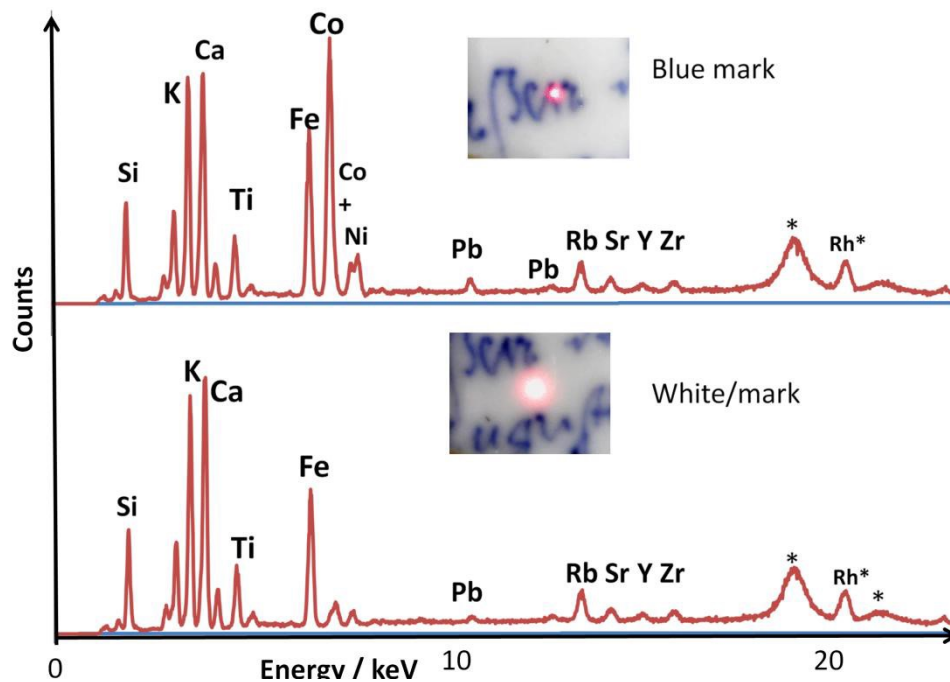
MNC 2274.9

Green

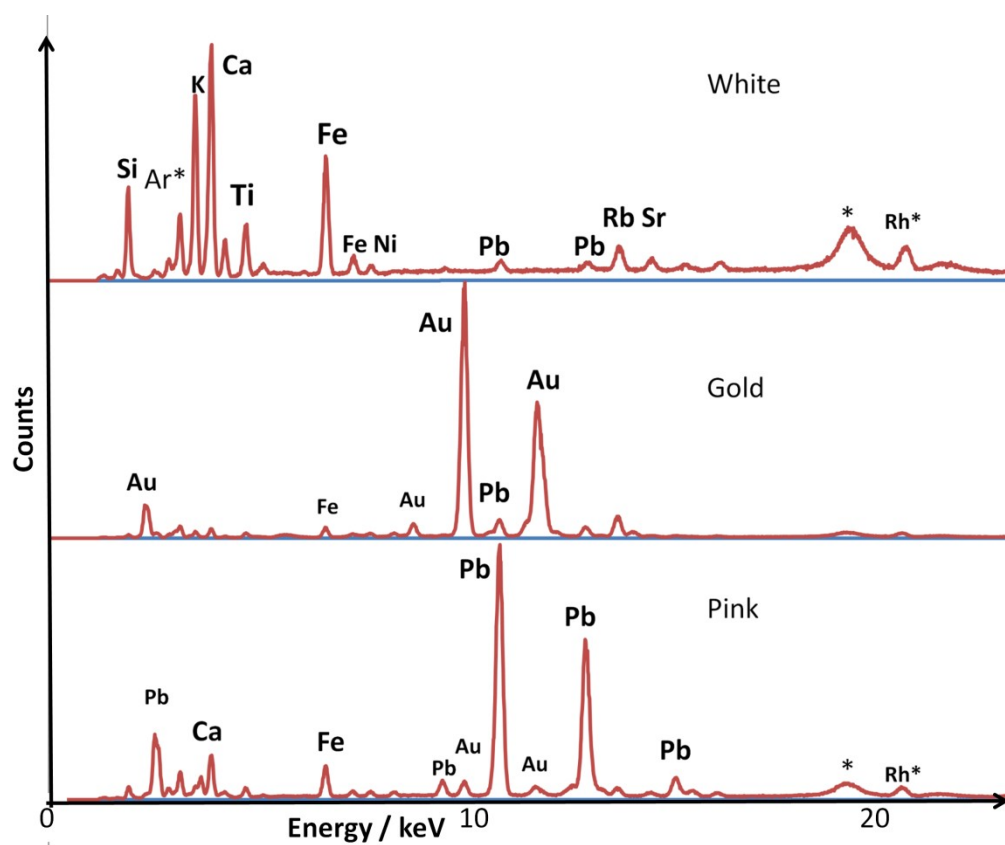


MNC 2274.9

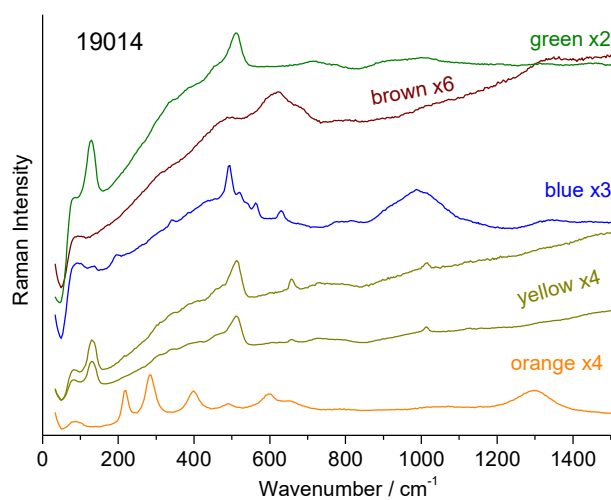
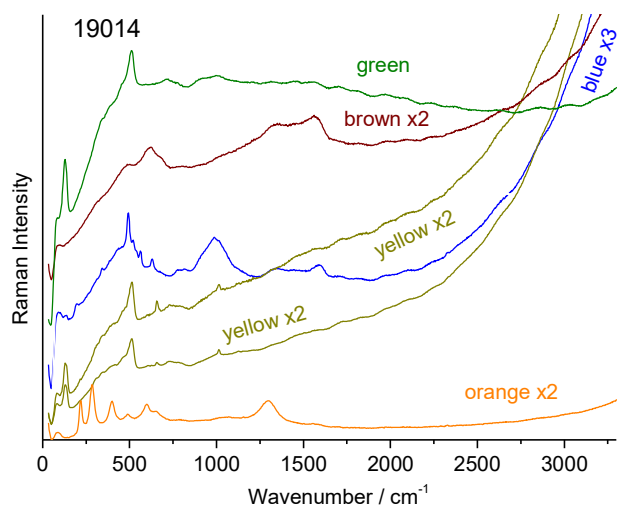
(bowl)  
1726



(bowl)  
1726



19014



H5.3

Armes de France & Pologne

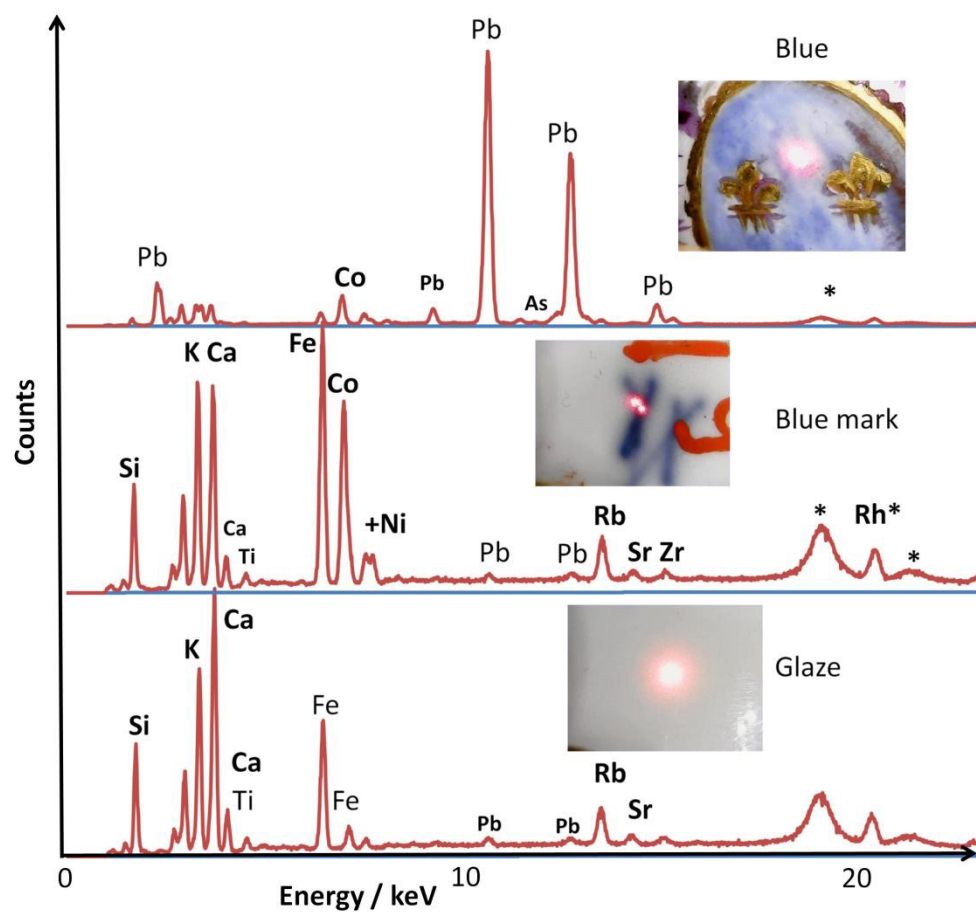
France & Poland Arm Coat

Service offert par / offered by Auguste III

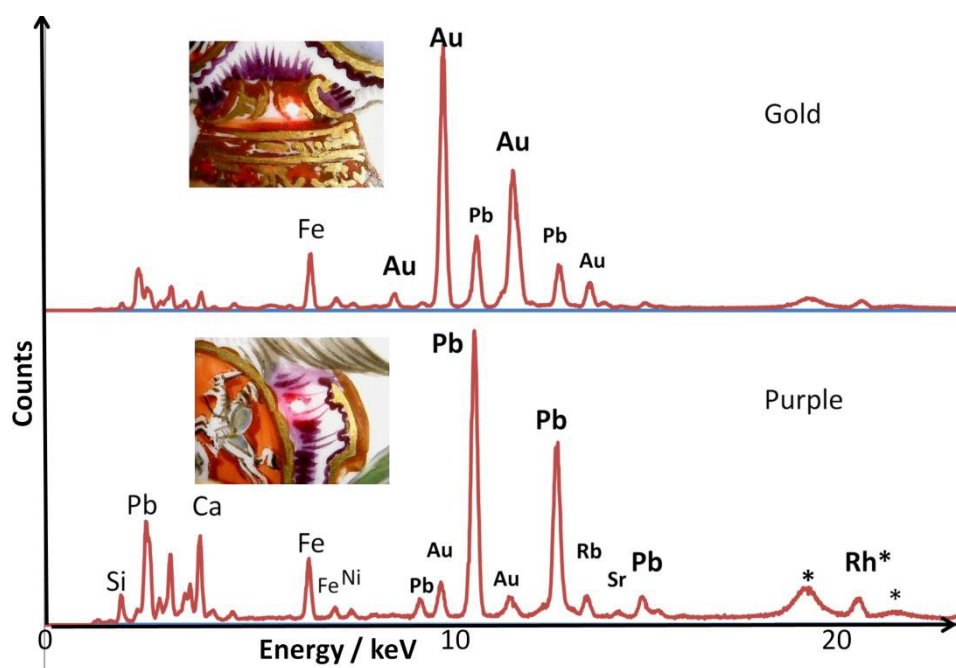
à/to Marie Leszcynska en 1737

Donnated by Armand Wittekind in 1936

MNC 19014  
(coffee cup  
with arm coat  
of France and  
Poland)



MNC 19014  
(coffee cup  
with arm coat  
of France and  
Poland)

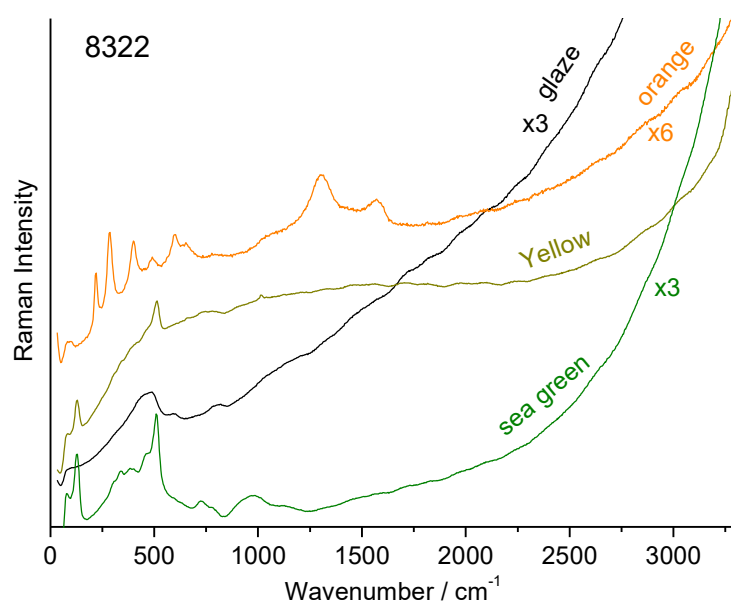
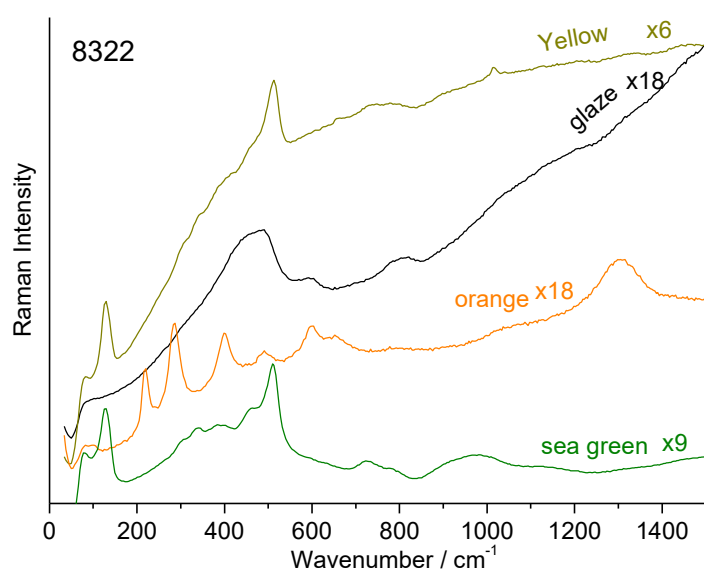


8322

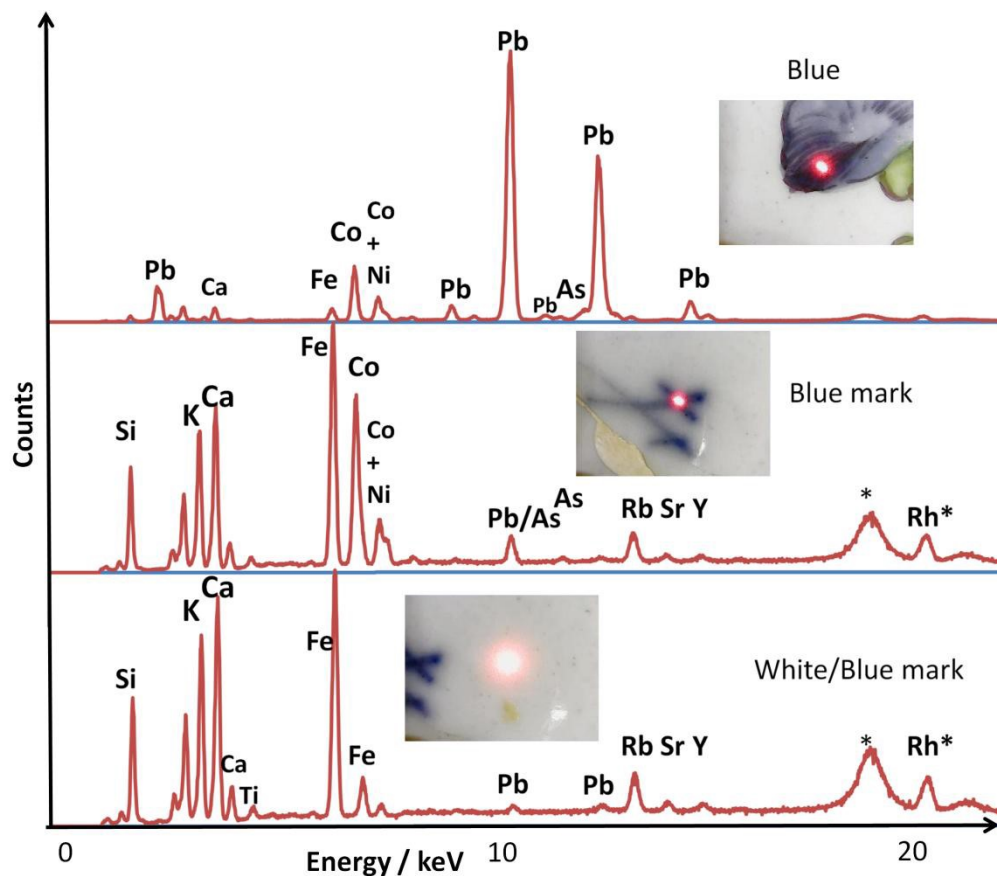


c.a. 1740-1760

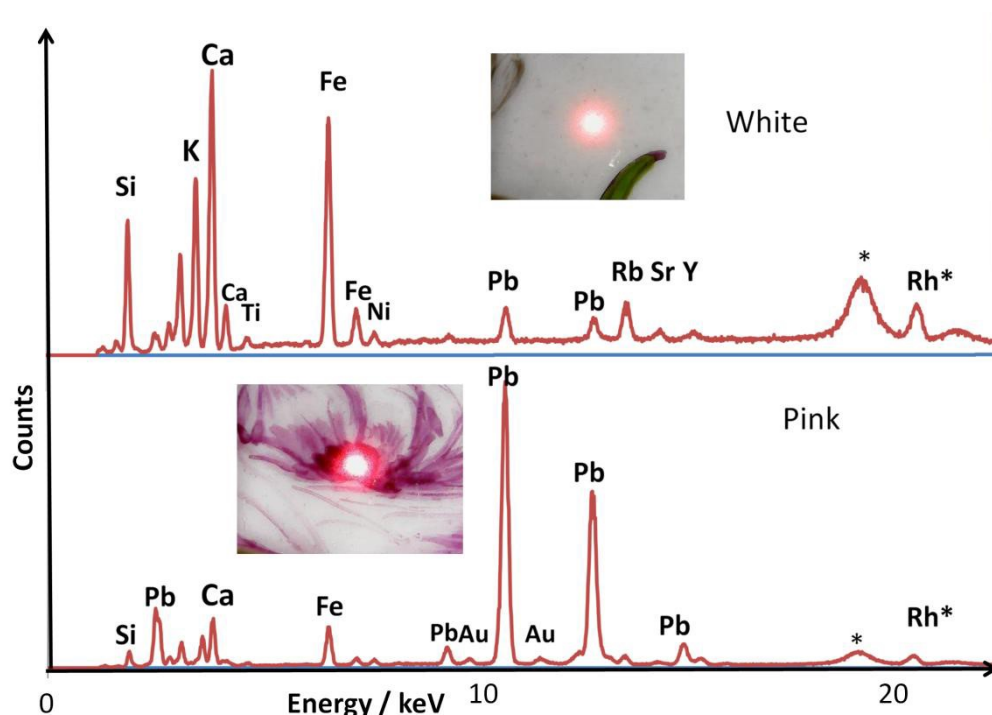
24.4x11.3 h10.3 acquisition : 1884 (Villaire)



MNC 8322  
1740-60  
Bourdalous



MNC 8322  
1740-60  
Bourdalous

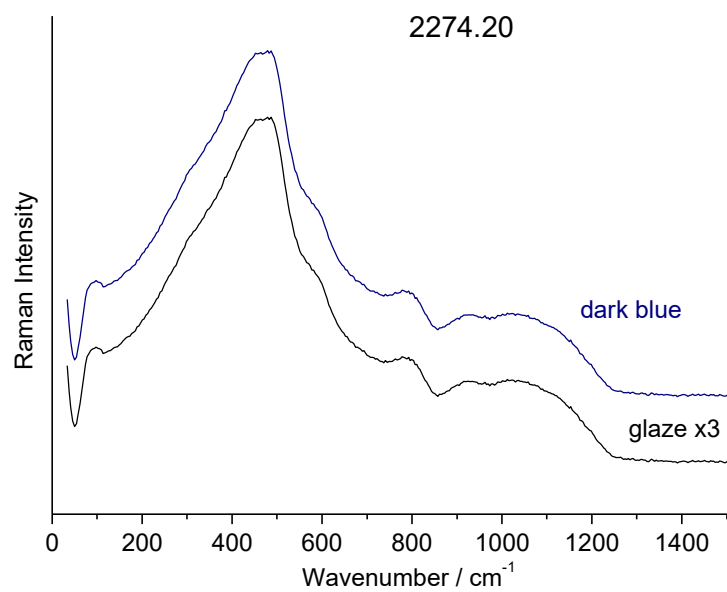
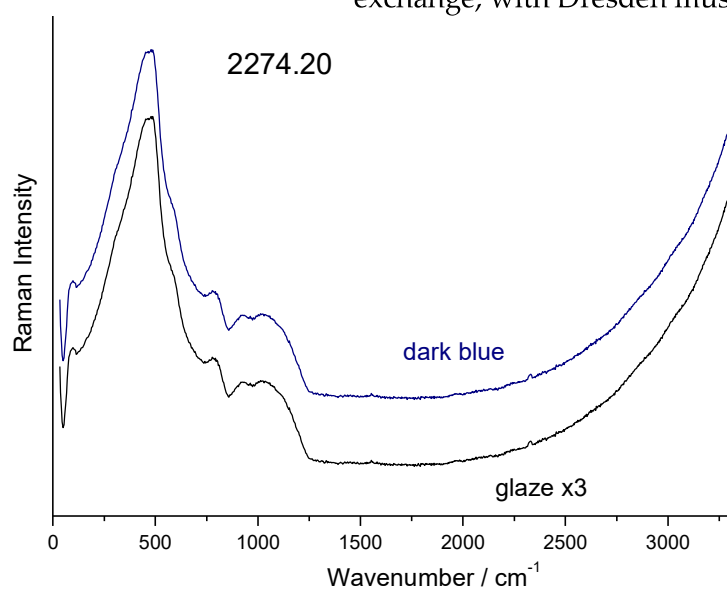




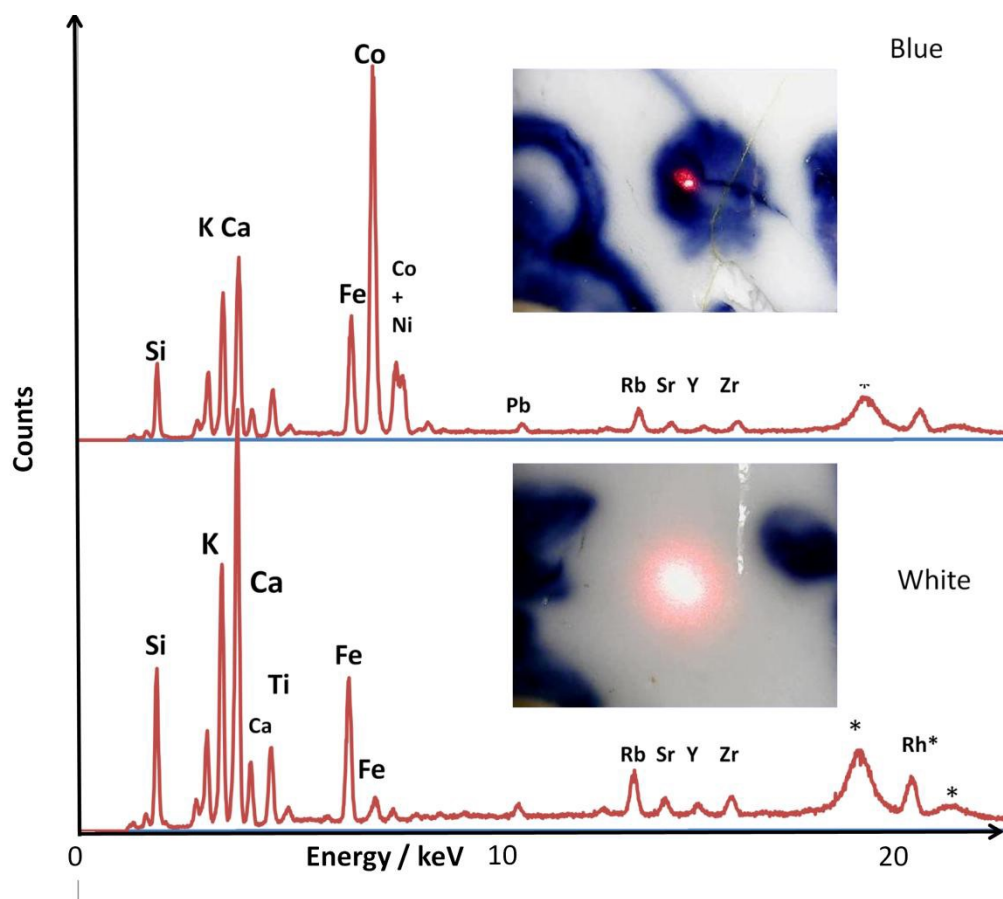
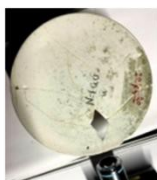


2274.20

Butter cup,  
c.a. 1730  
exchange, with Dresden museum 1837



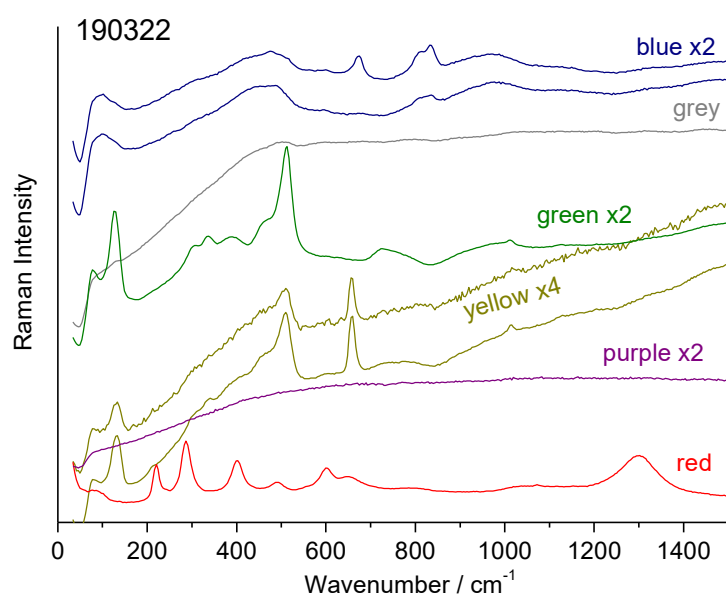
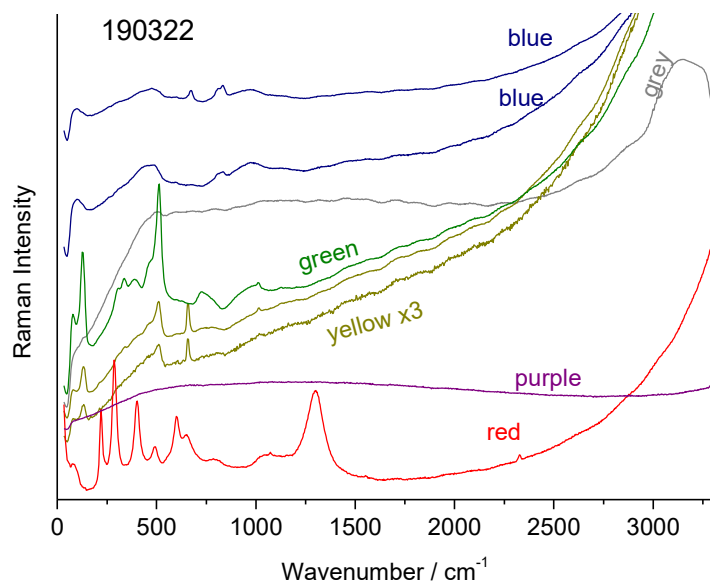
MNC 2274.20  
(butter cup)  
Augustus mark  
18<sup>th</sup> c.



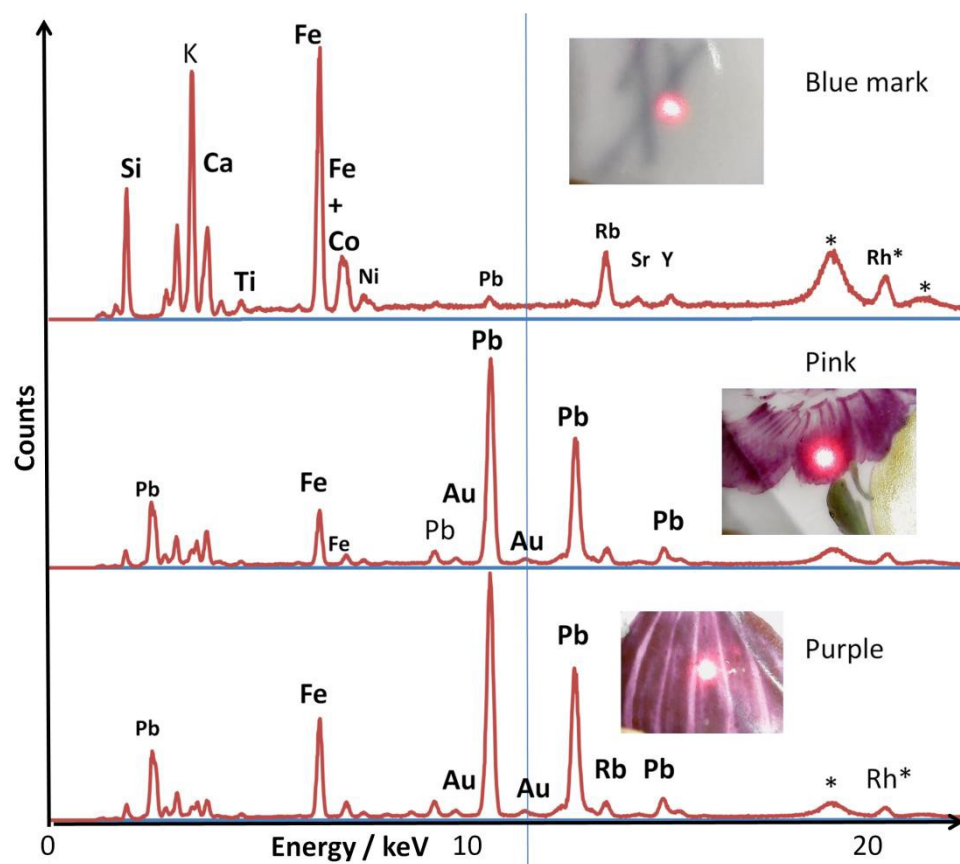
MNC 19032.2

9.3 H7.7

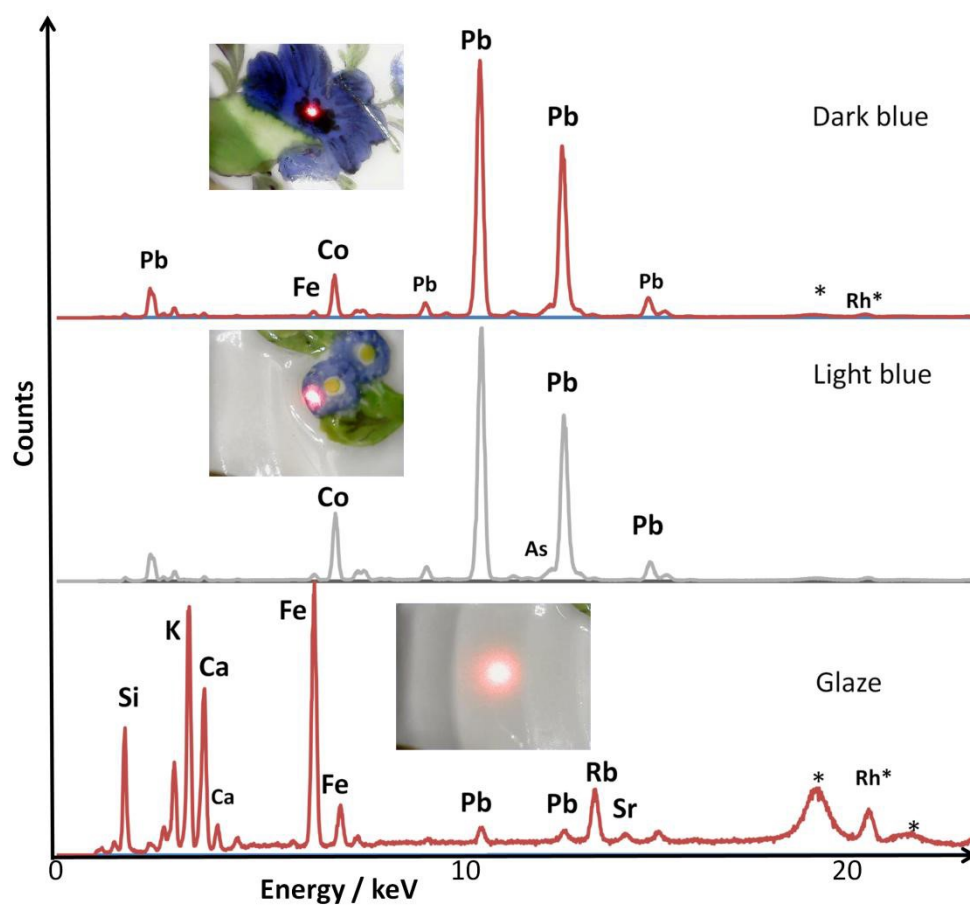
18<sup>th</sup> c. (formerly, collection of Musée de Cluny)

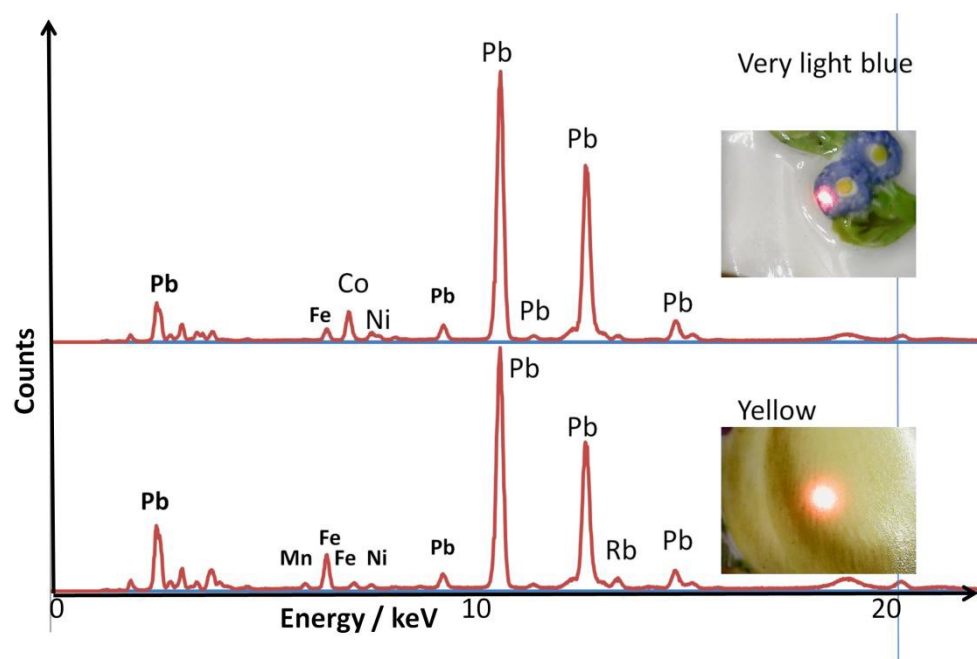


MNC 19032.2  
(mustard cup)  
18<sup>th</sup> c.

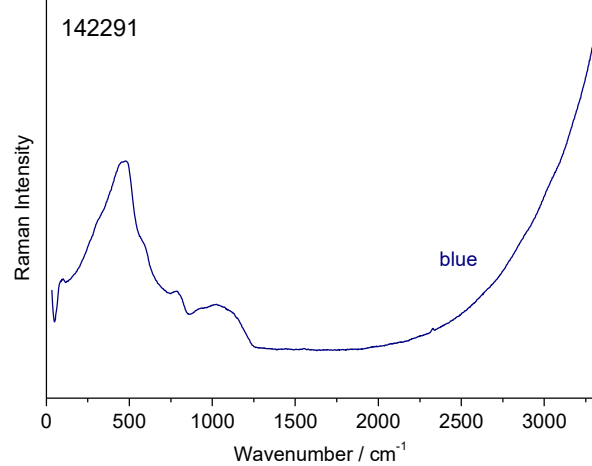


MNC 19032.2  
(mustard cup)  
18<sup>th</sup> c.





MNC 14229 1

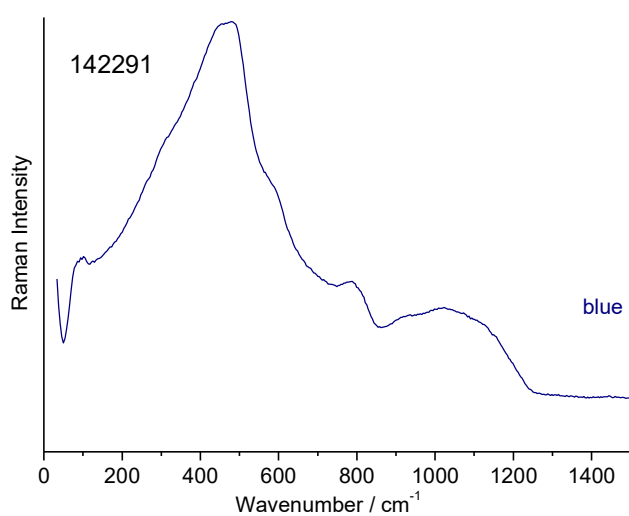


Chocolate pot

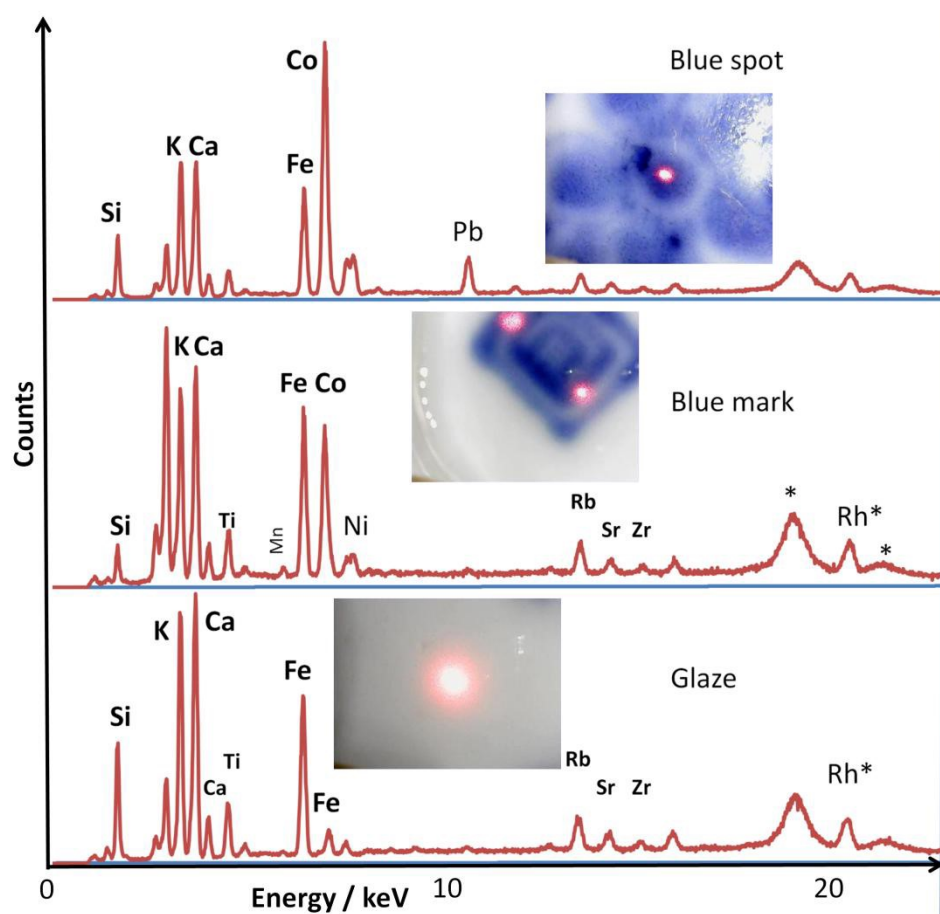
18th c.

Antoine-Gaston Grollier bequest (1908)

13x7.4 H9.7 (+ couvercle)



14229.1  
Chocolate pot



b

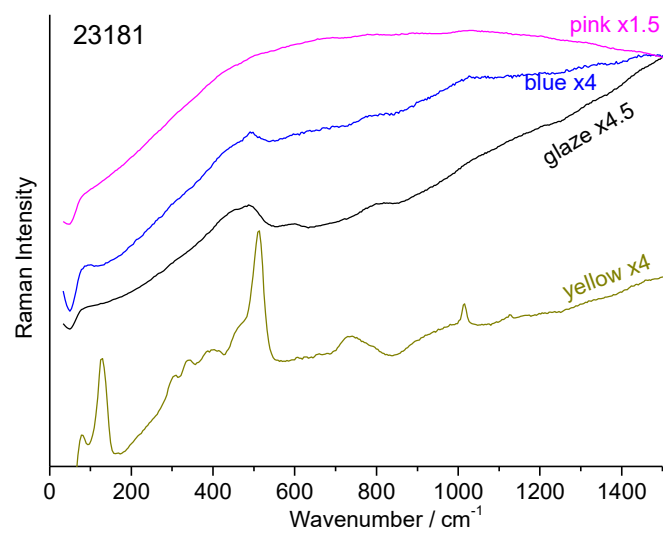
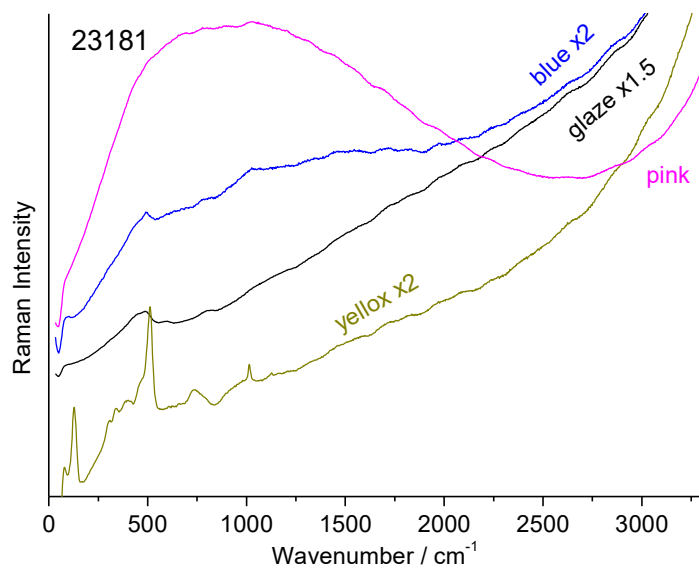


MNC 23181

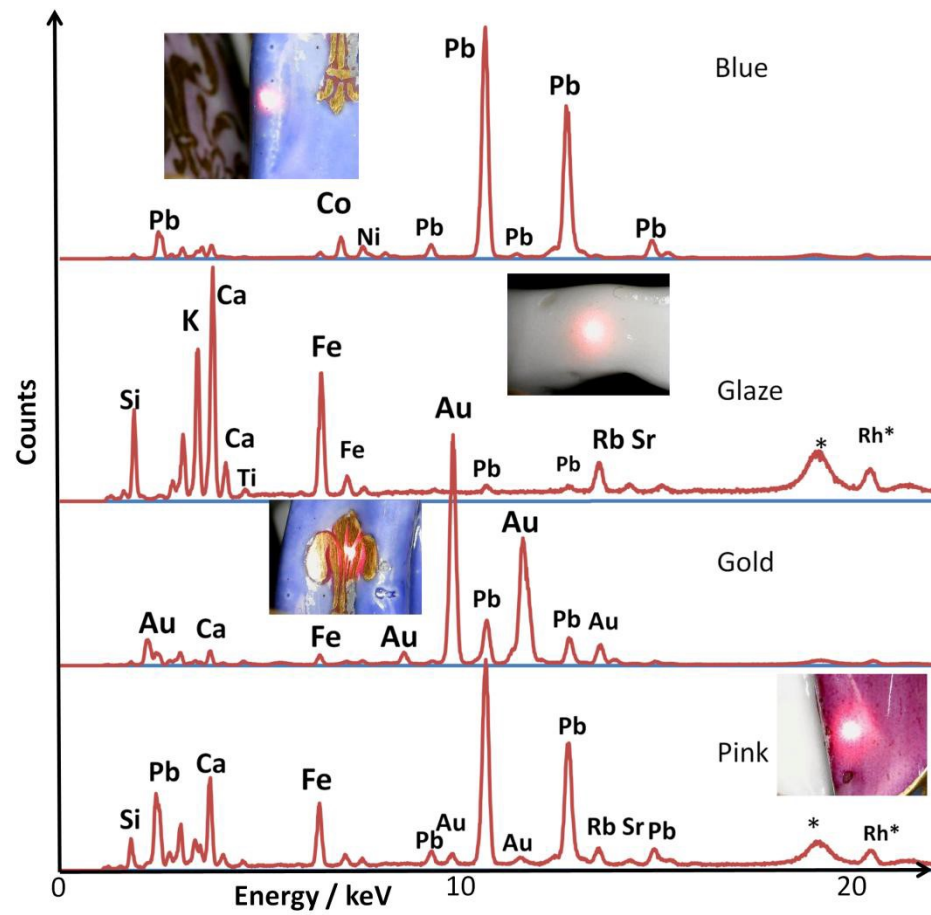
Louis XV, 1746 (for the wedding by procuration at  
Dresden of French Dauphin with Marie-Josèphe von  
Saxe)

13x15.5 H16.2

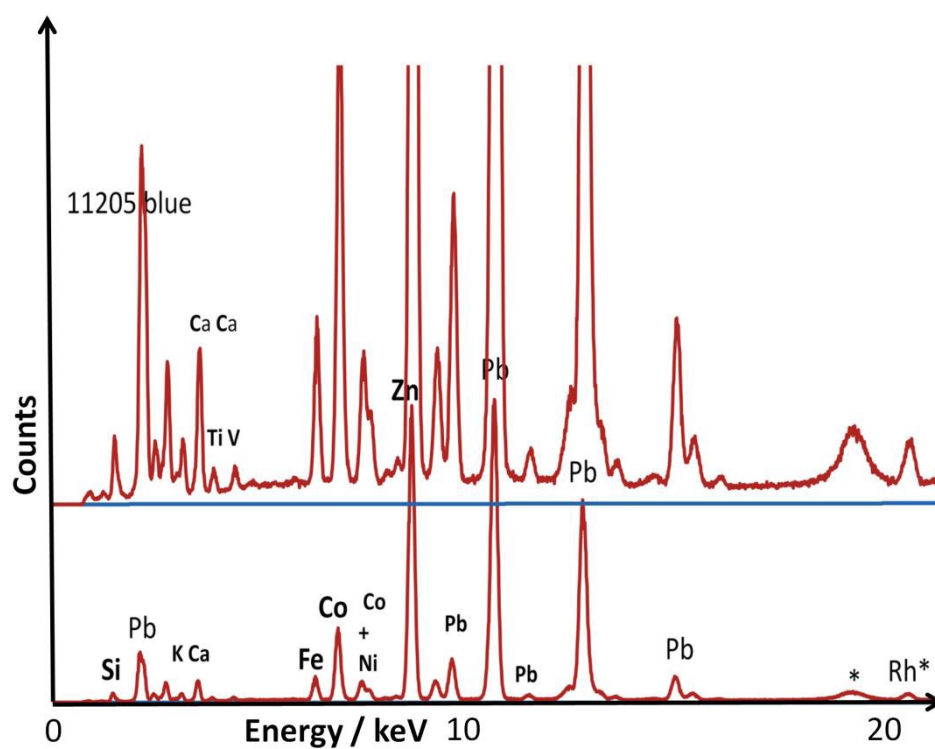
1963 Anne-Jules Noailles bequest



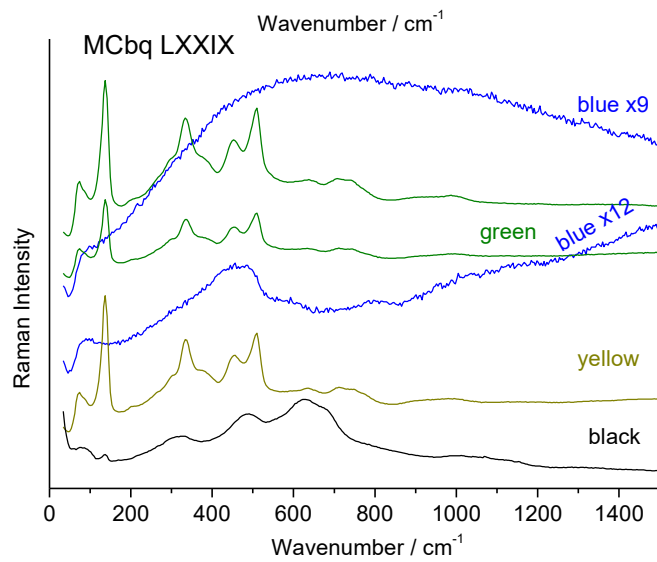
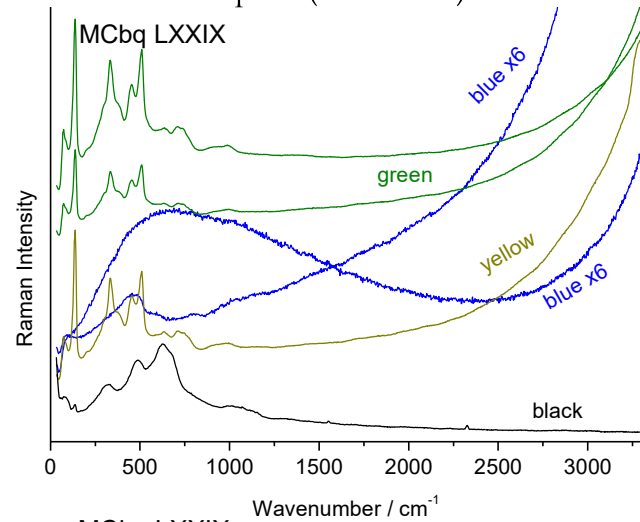
MNC 23181  
 (Louis XV figure  
 1746  
 wedding of  
 France Dauphin  
 and  
 M.-J. de Saxe)



MNC 11205  
(Bacchus &  
bacchante  
group)

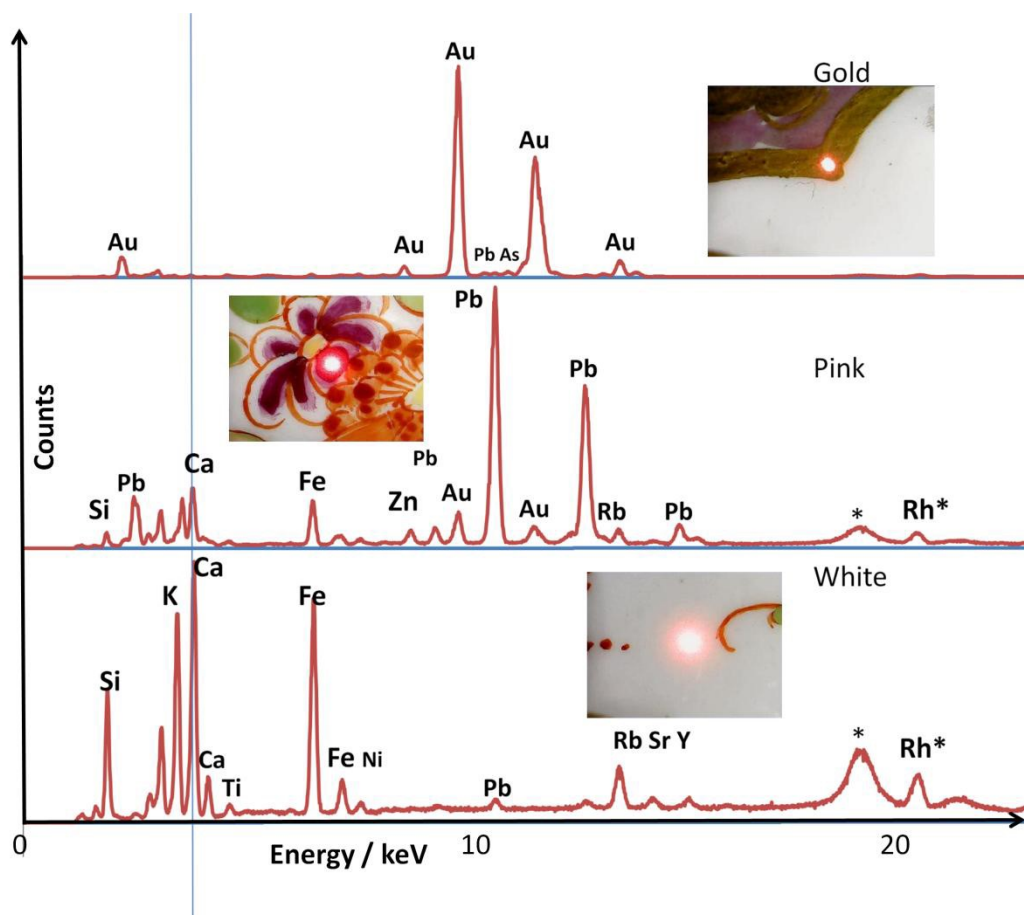


MCSR LXXIX soupière (MNR 1949)

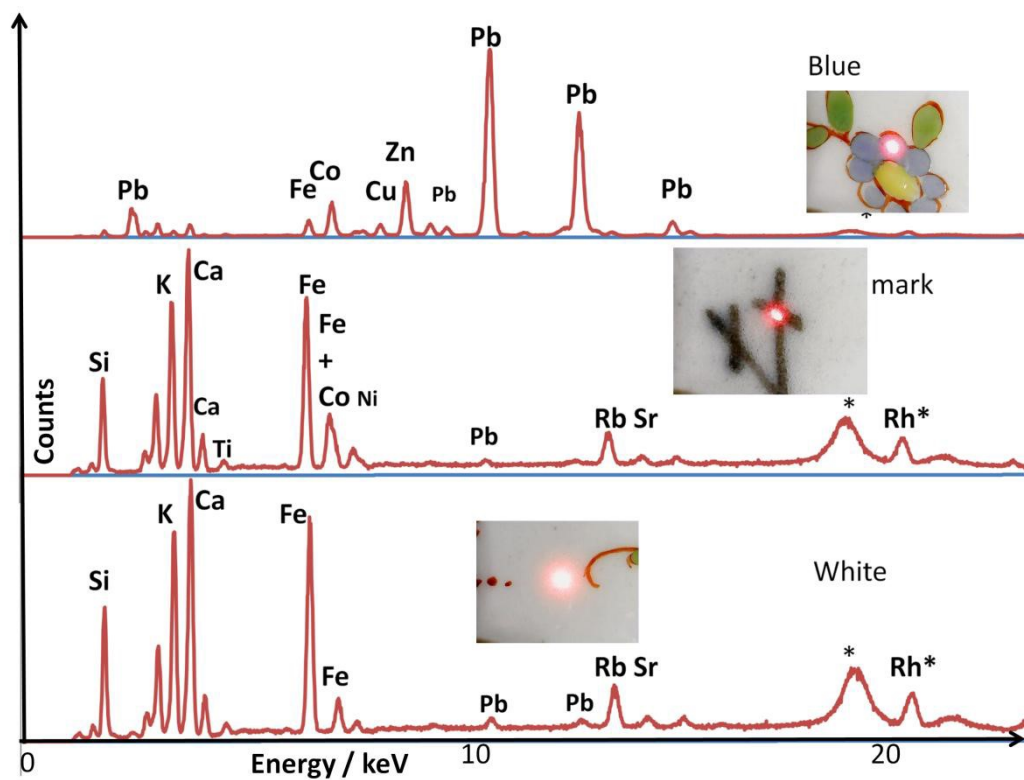


c.a. 1720-1730  
20.4x H7.3

MCSR  
LXXIX  
Large  
Tureen  
ca 1720

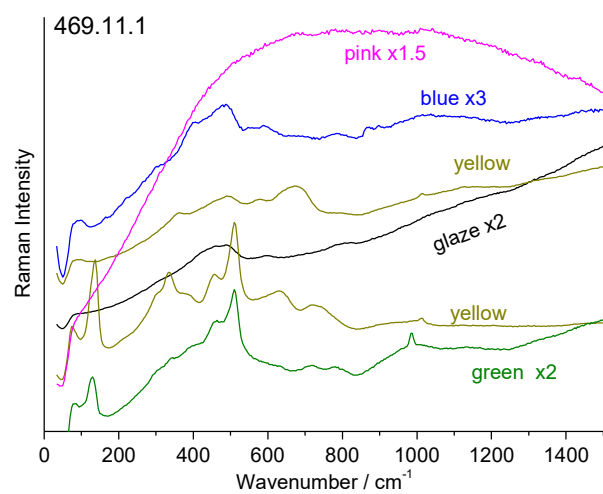
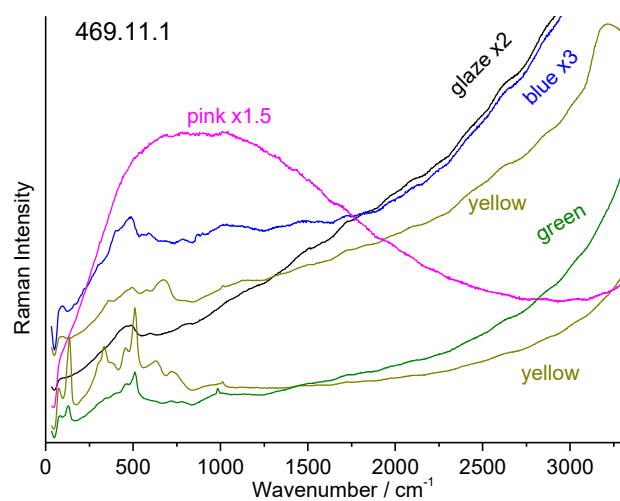


MCSR  
LXXIX  
Large  
Tureen  
ca 1720



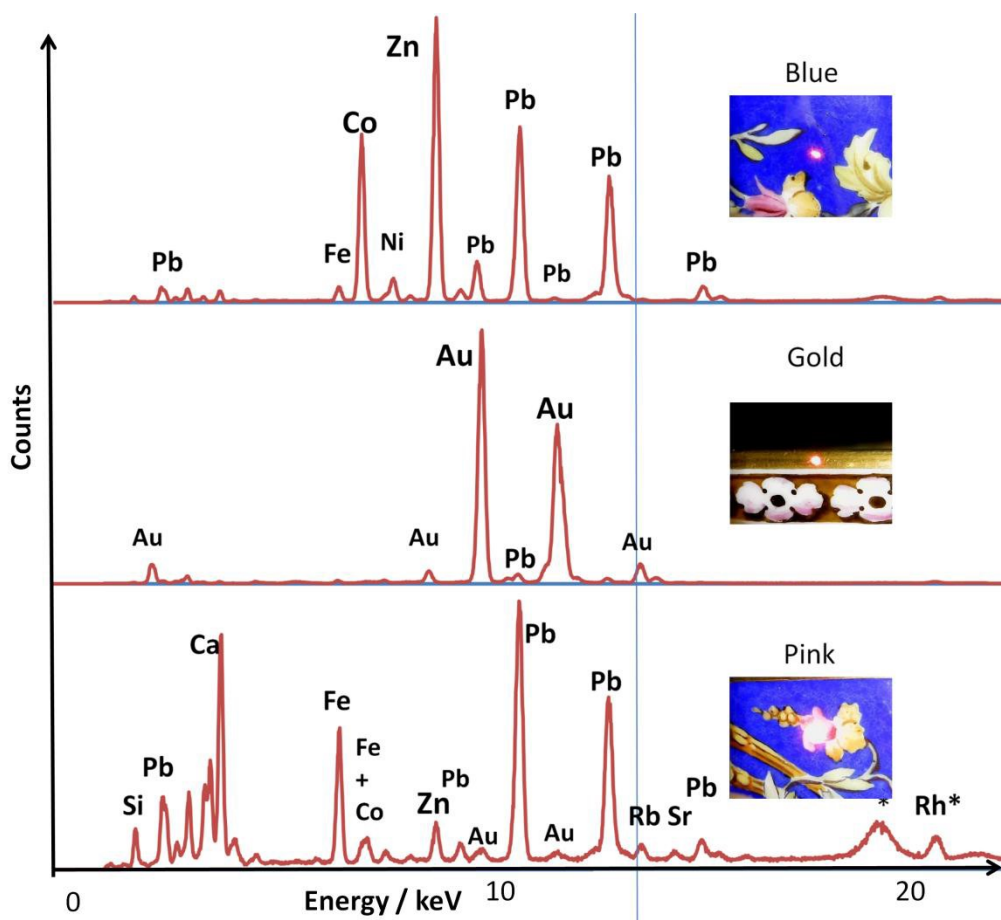
469.11.1  
c.a. 1720-1725  
Acquisition in 1806

Tea cup  
10x8 H7  
Tasse à thé litron



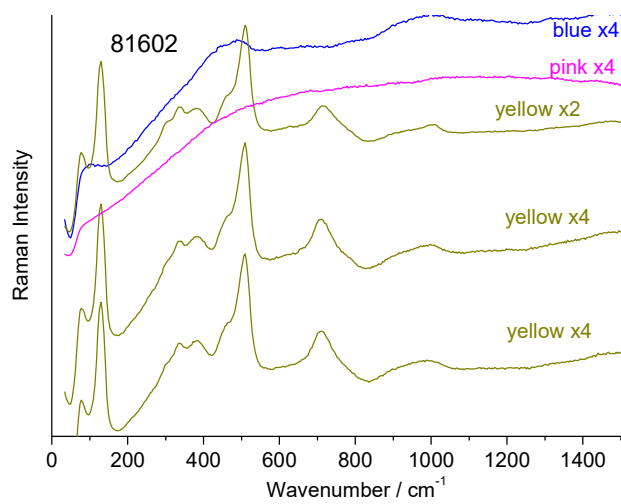
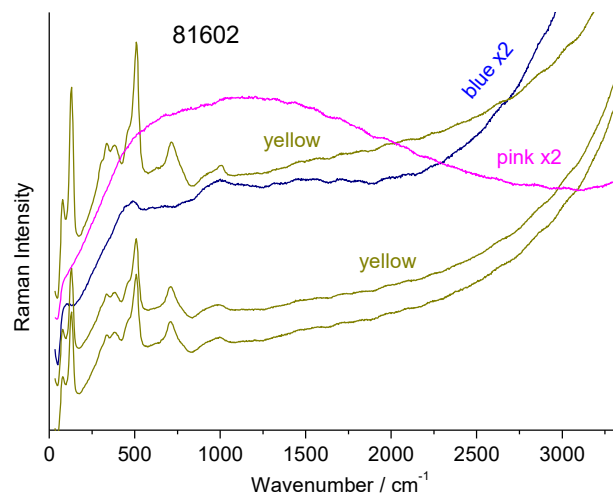
MNC 469.11 .1

Tea cup





MNC 8160.2



12x12 H2.7

1882 Lugel-Dolfus bequest

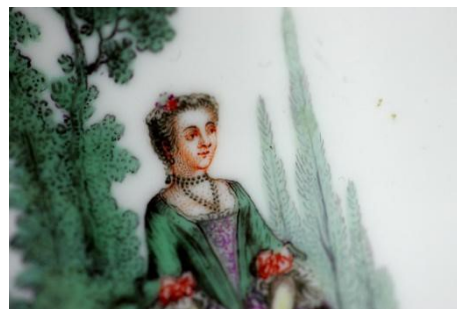
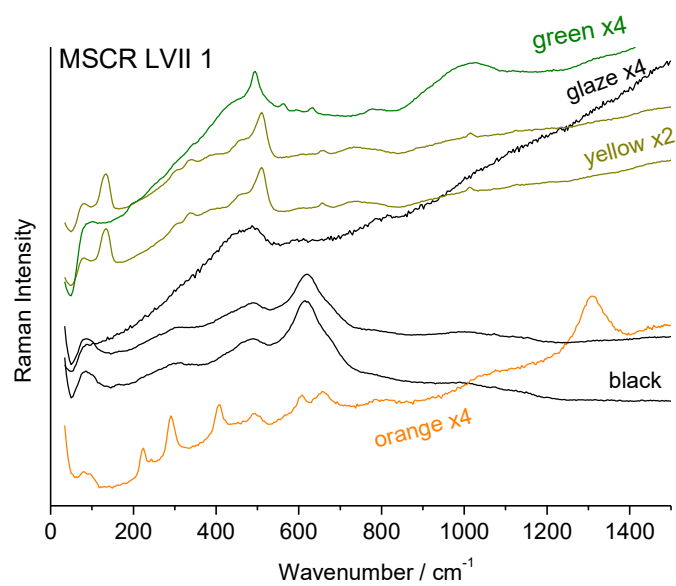
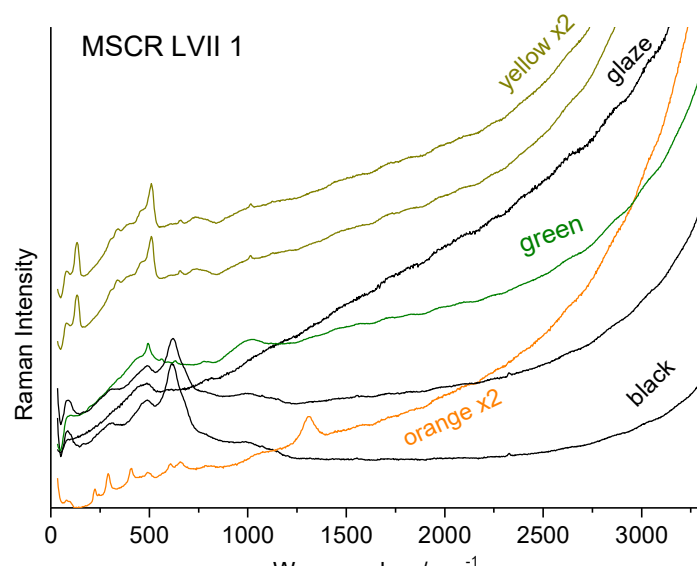
c.a. 1720

MSCR LVII 1 tasse (MNR récup 1949)

c.a. 1745

Décor à la Watteau

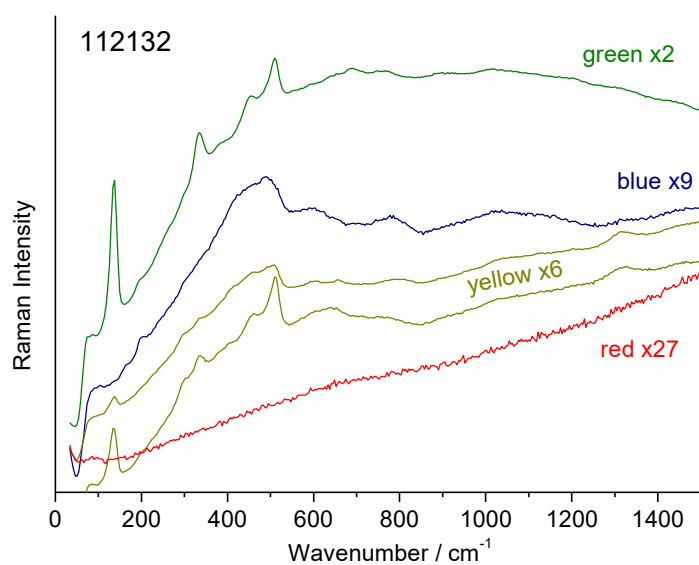
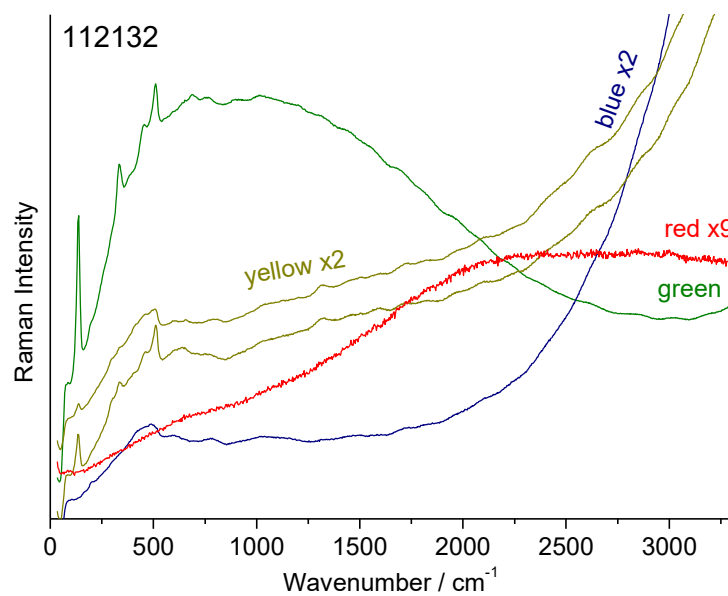
Watteau-like décor



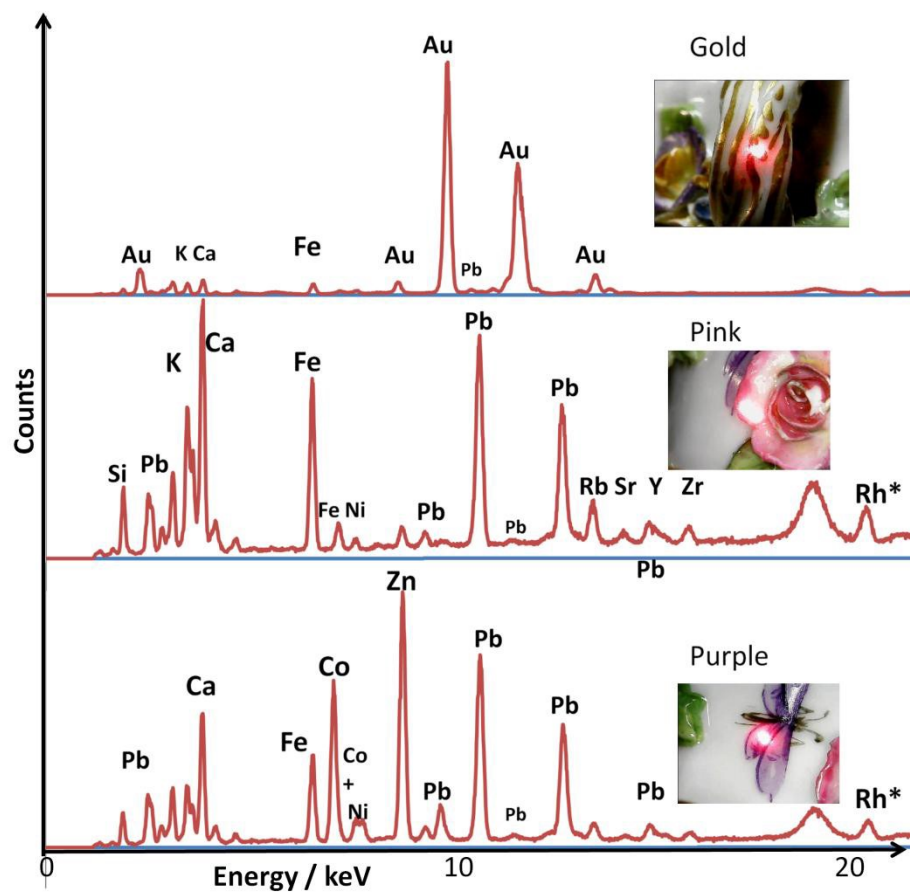
MNC 11213.2

7.7x6.5 H3.7

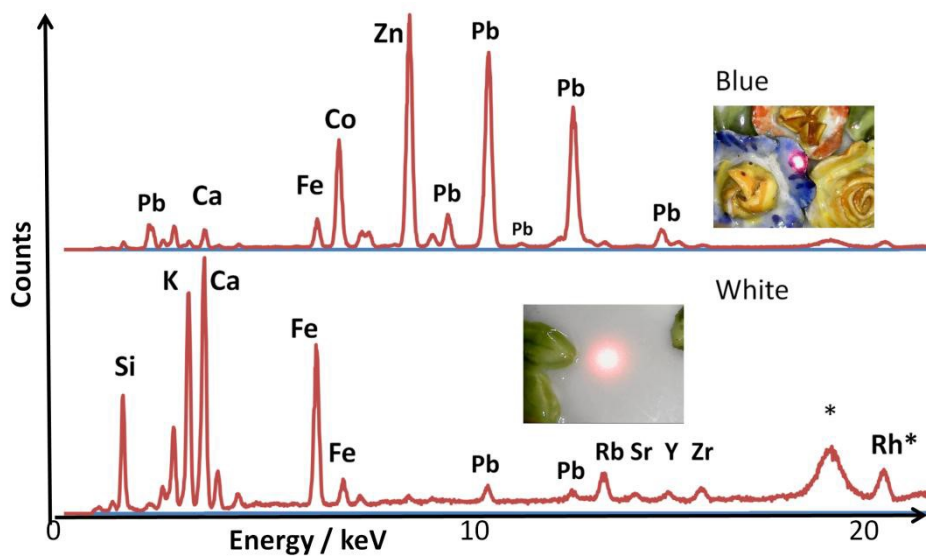
Gift of Dècle Eléonor 1902



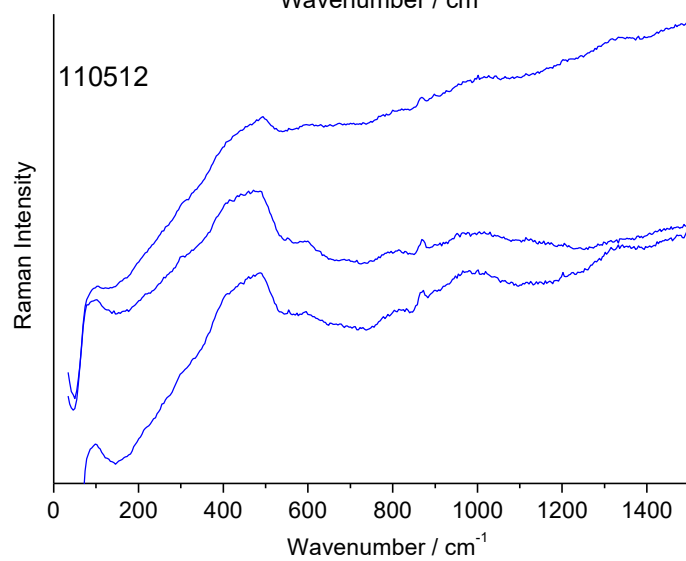
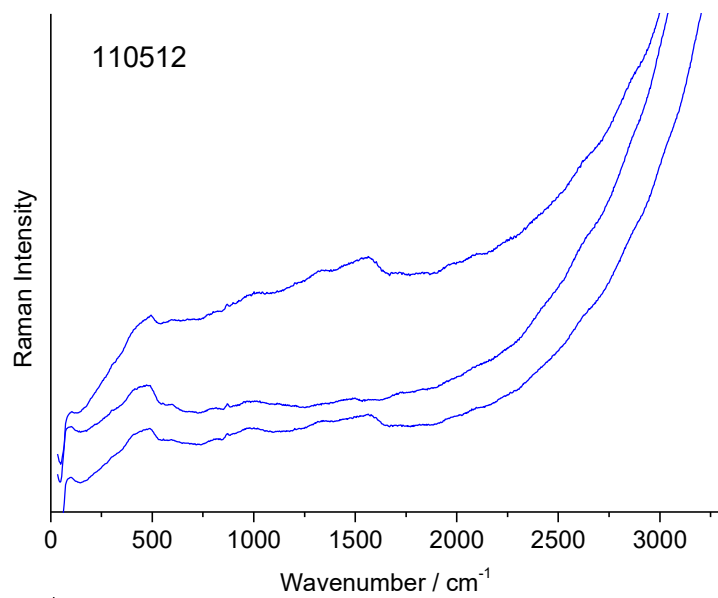
MNC 11213.2  
Coffee cup  
18<sup>th</sup> c.



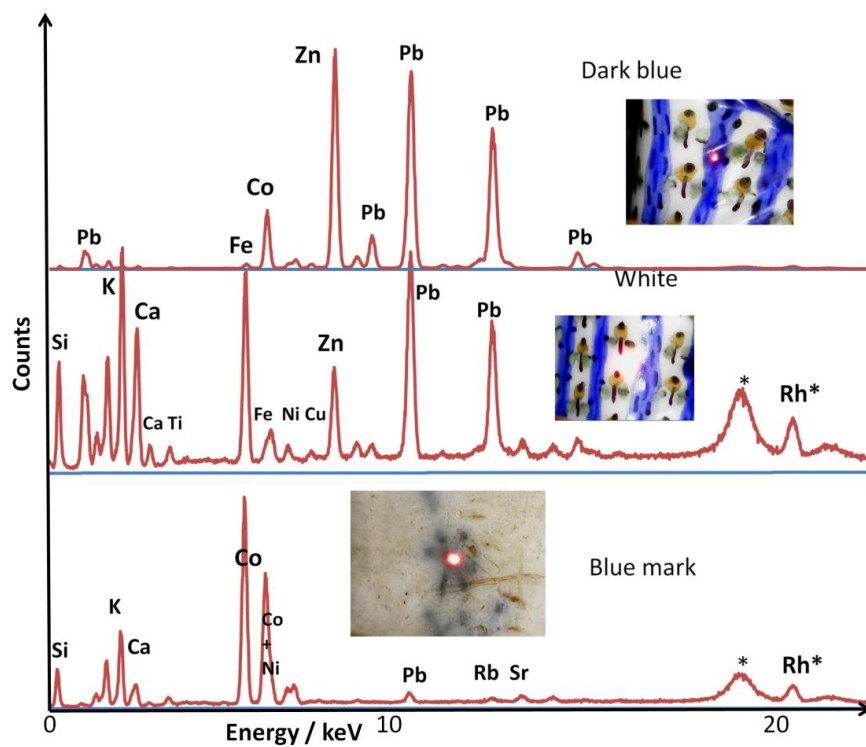
MNC 11213.2  
Coffee cup  
18<sup>th</sup> c.



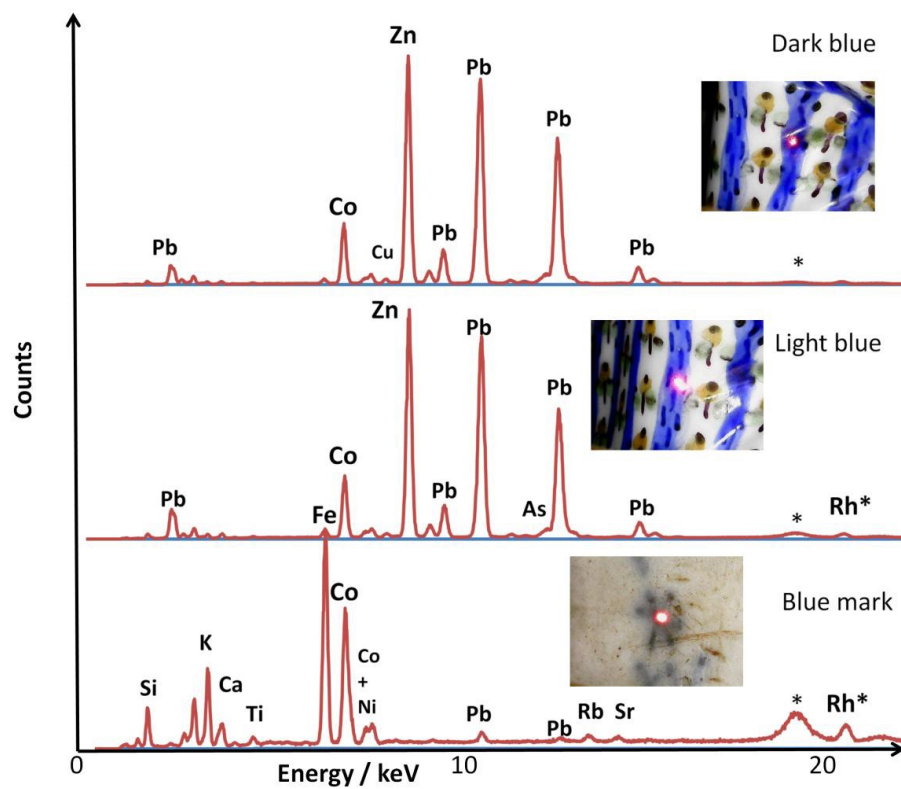
MNC 11051.2 Figure  
5.4x4.7 h12.2  
Gift in 1902 of Eléonor Dècle



MNC 11051.2  
(boy figure)



MNC 11051.2  
(boy figure)

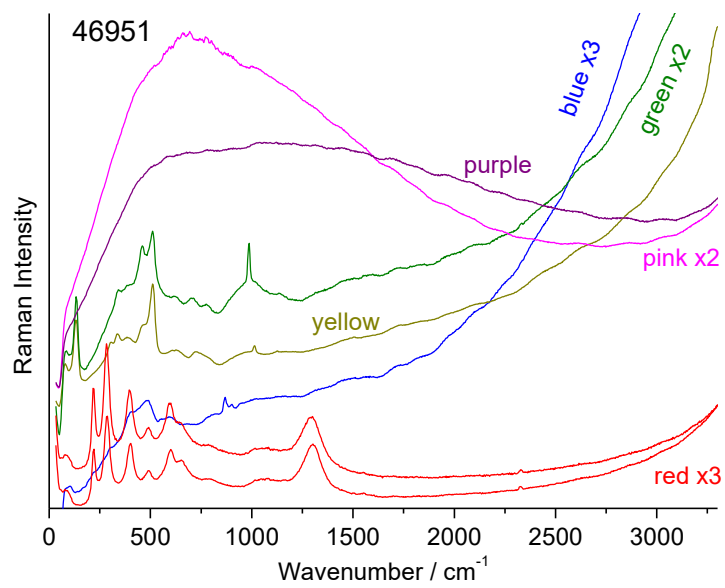


marque

vieu coal, decor avec ZnV

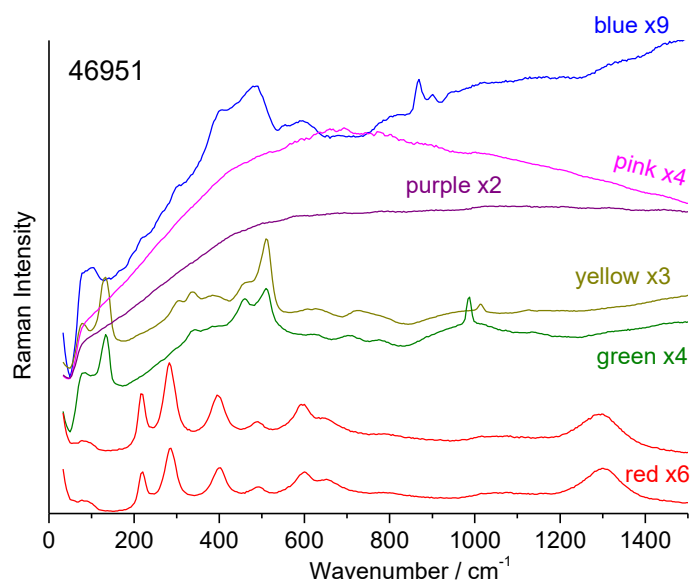


MNC 469.5.1 coffee cup



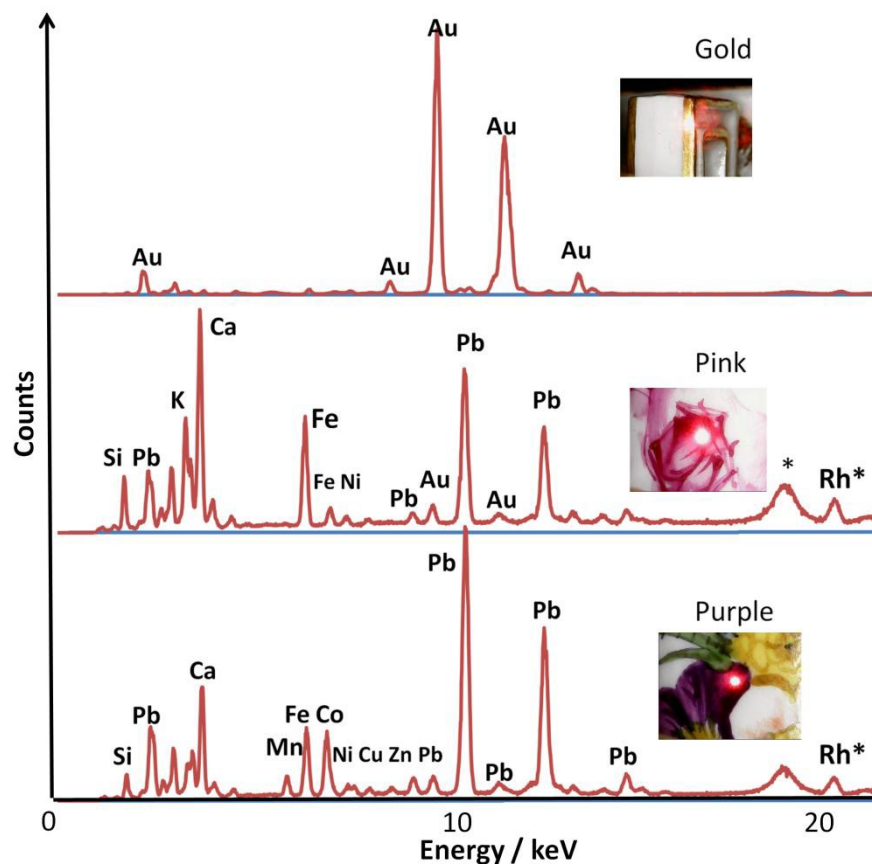
8.5x6.5 H6.3

19<sup>th</sup> c.?

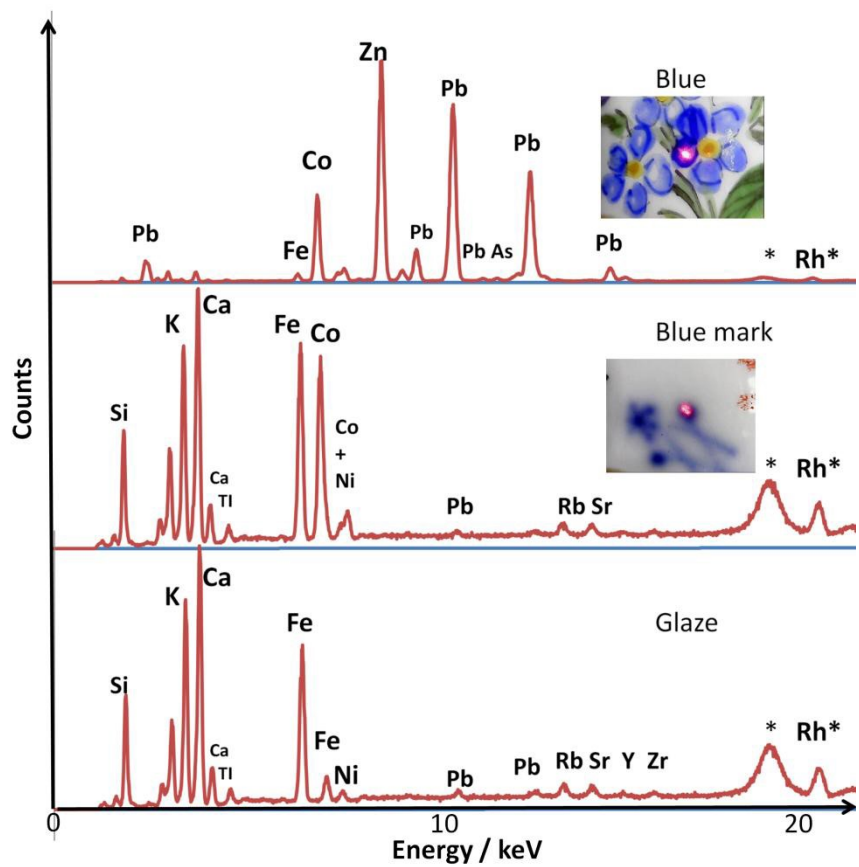




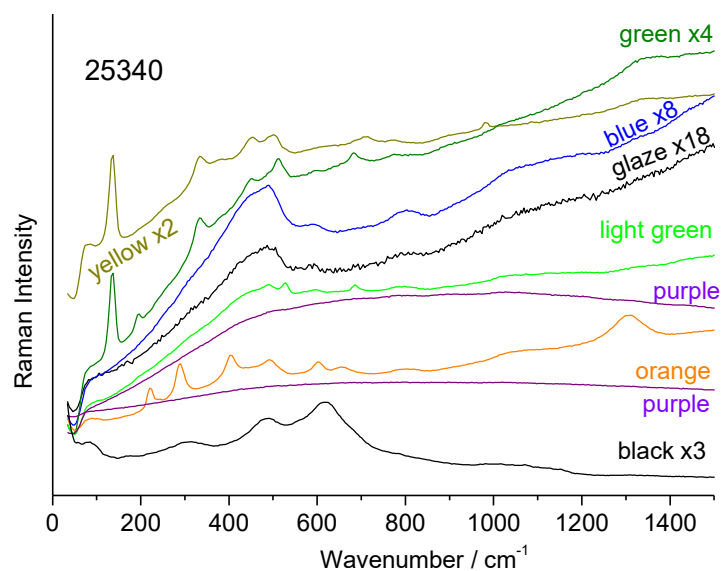
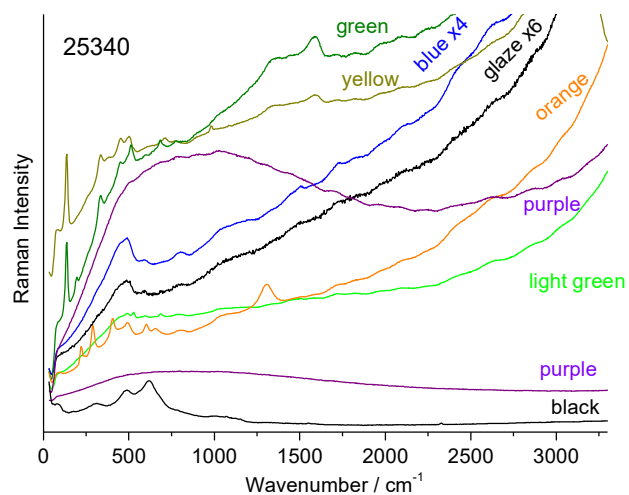
MNC 469.5.1  
(coffee cup)



MNC 469.5.1  
(coffee cup)

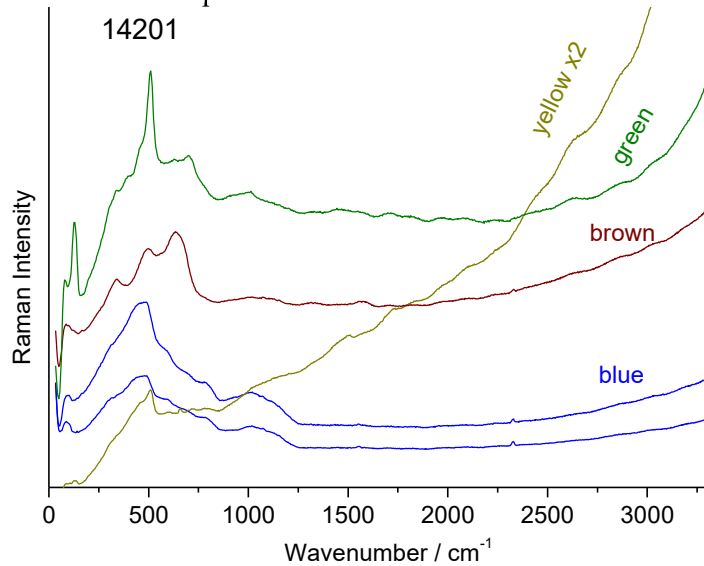


MNC 25340



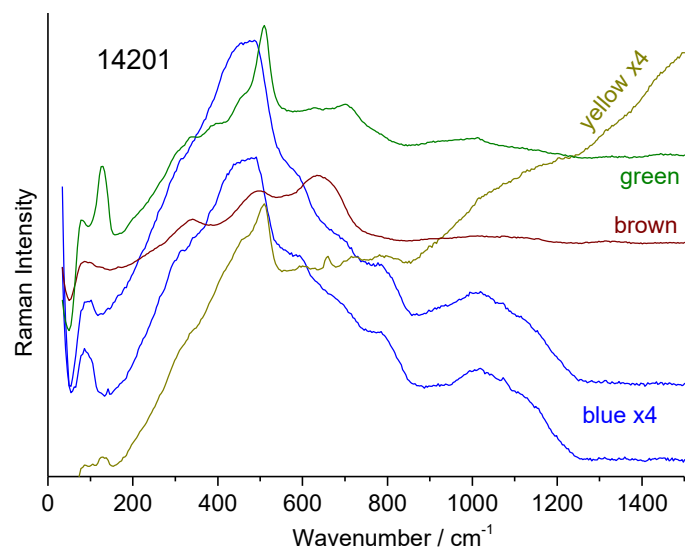
13.7x9.3 H15.5  
Cellier bequest, 1986  
19e

MNC 14201 teapot

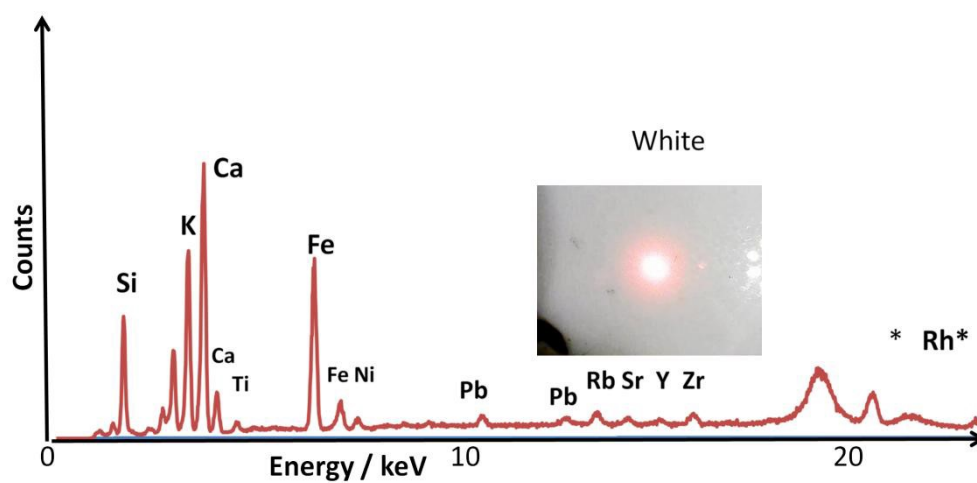


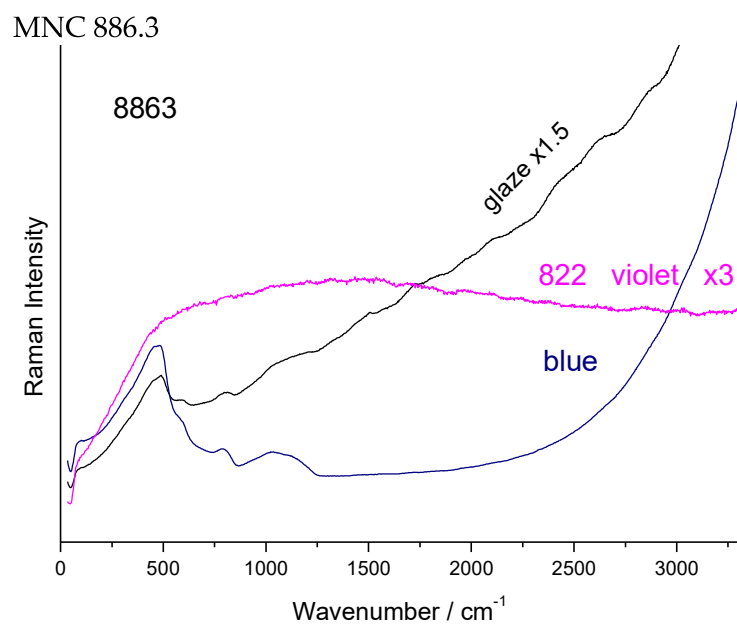
Antoine-Gaston de Grollier  
bequest (1908)

18th c.  
9.4 H9.4

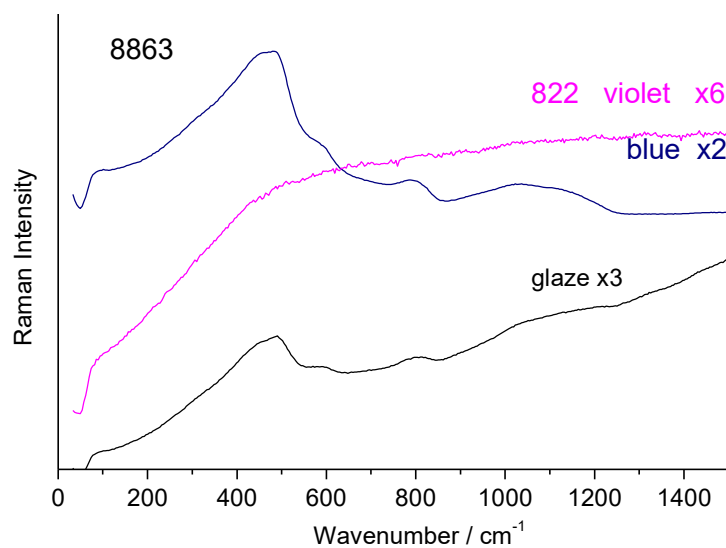


MNC 14201  
teapot

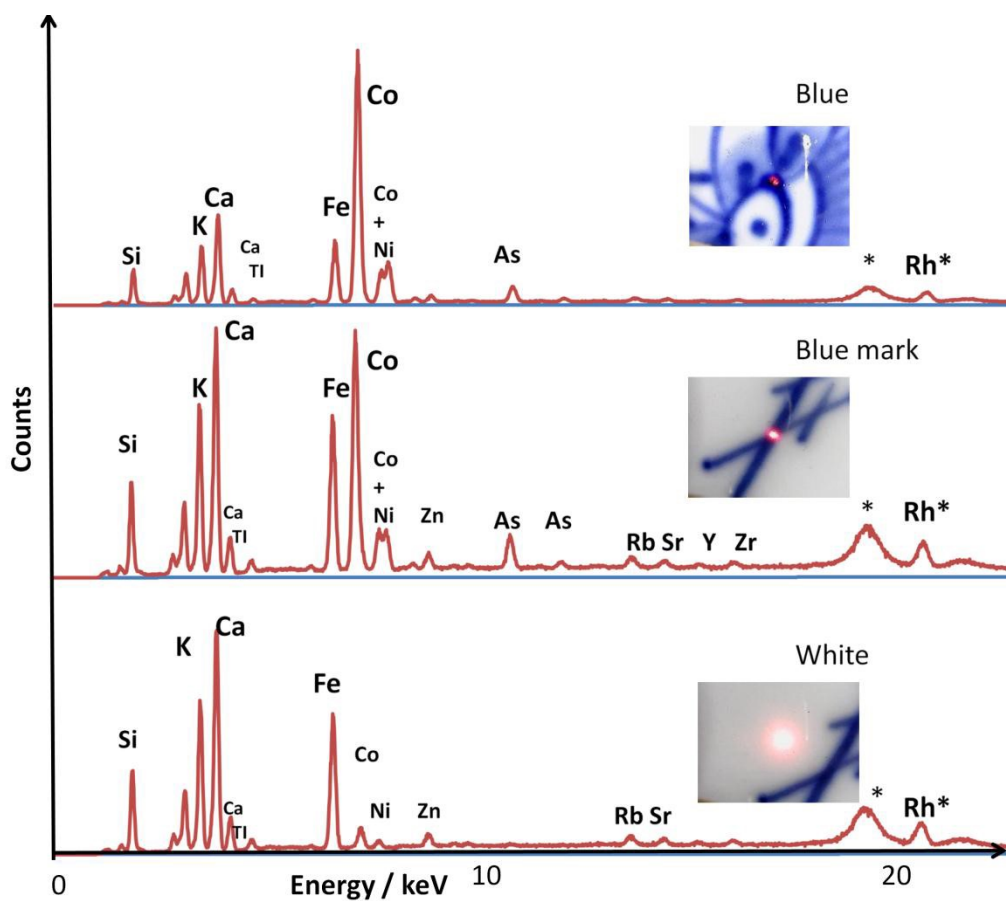




Envoi de M. Kühn, Meissen  
Acquisition by M. Kühn from  
Meissen Factory  
In 1825  
24.5x24.5 h3.2



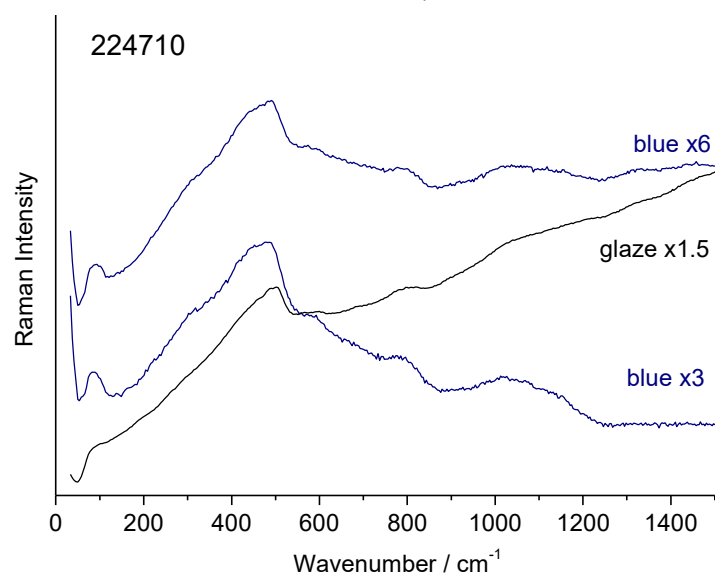
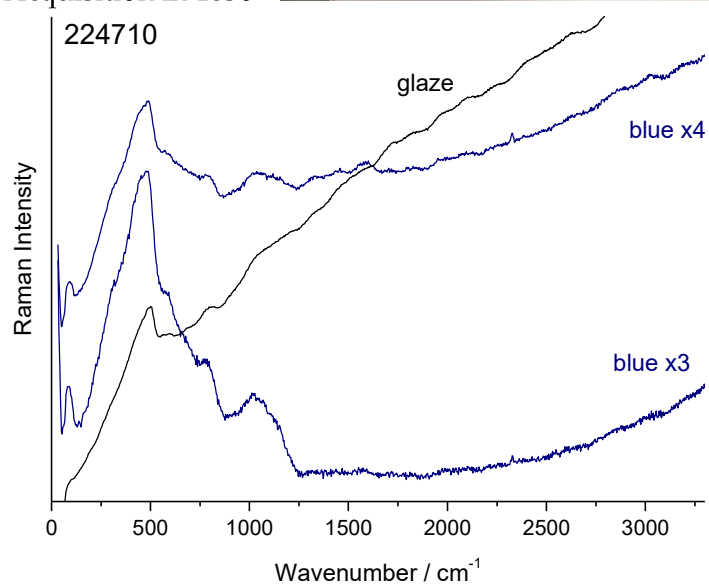
MNC 886.3  
1825



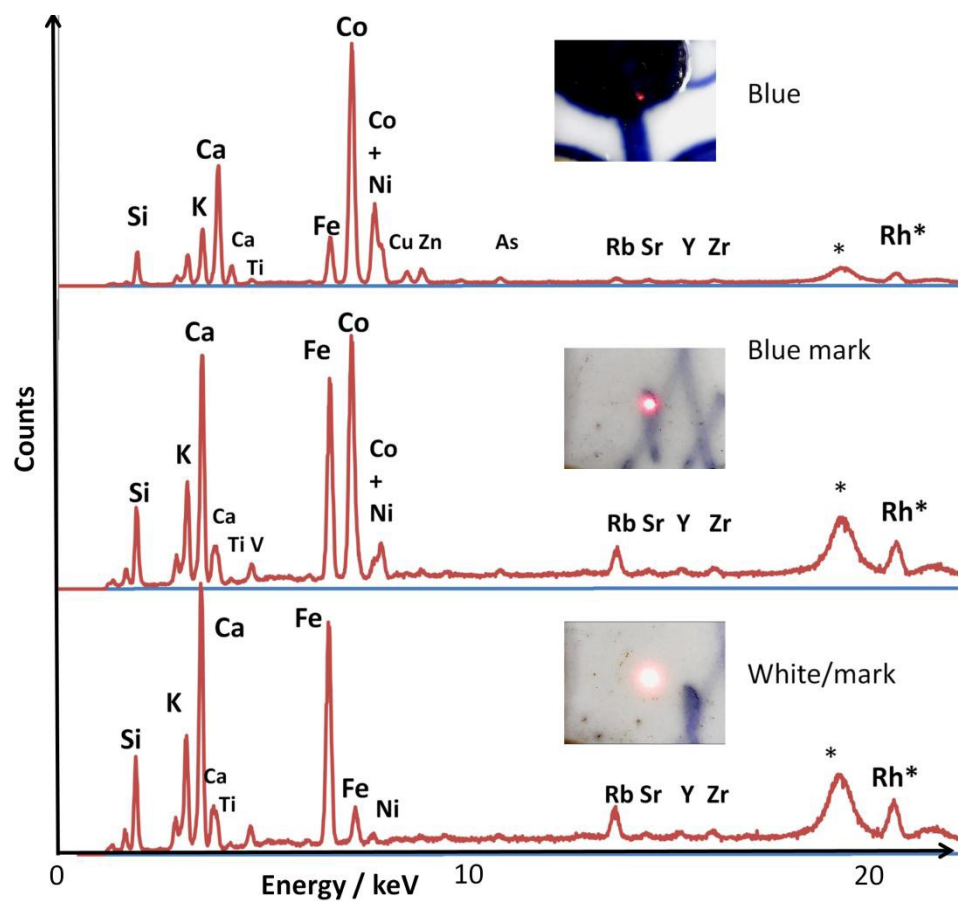
MNC 2247.10  
43.3x33 H5.5



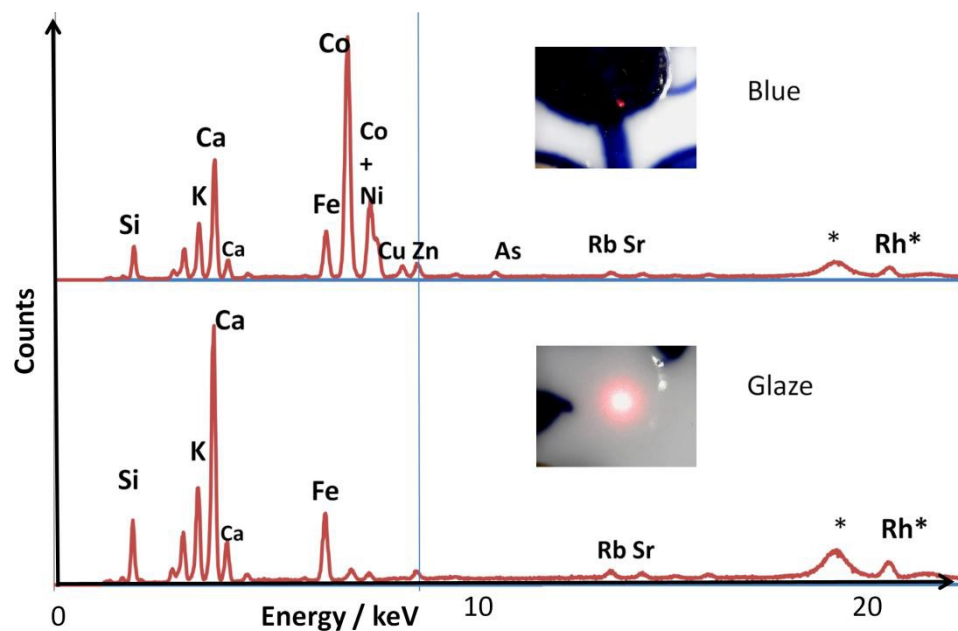
Acquisition in 1836



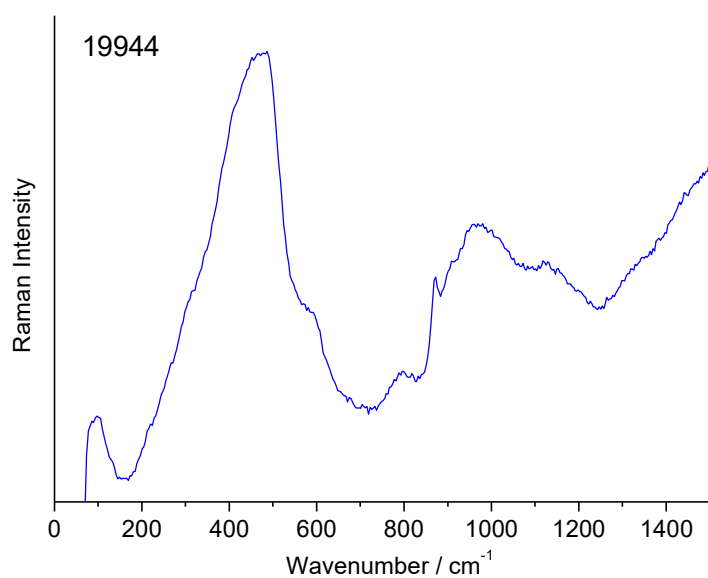
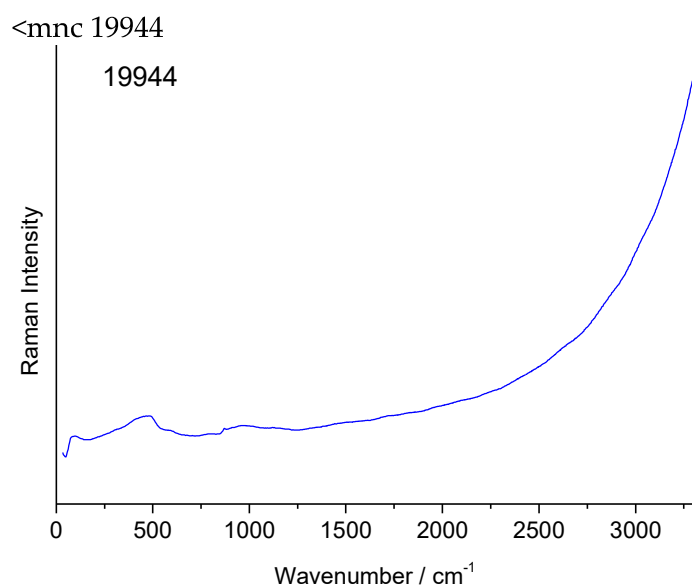
MNC 2247.10  
dish



MNC 2247.10  
dish

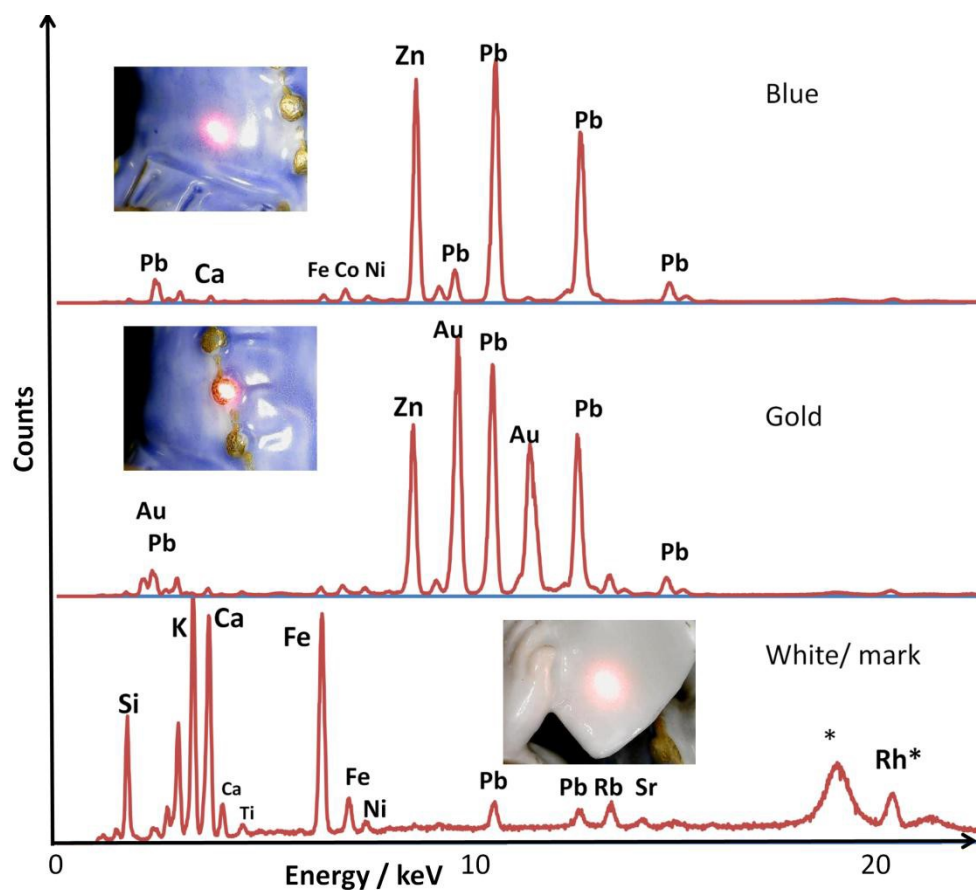




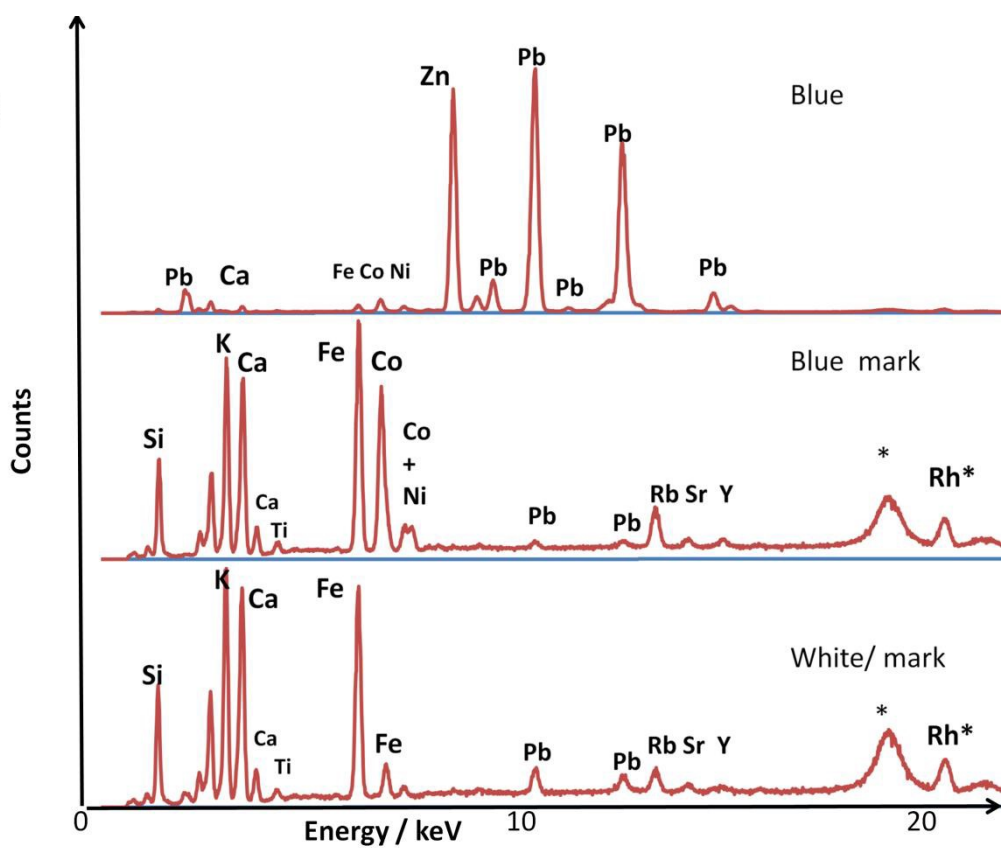


Ange chanteur  
Singing Angel Figure  
4.6x4.1 H8.3  
Formerly, collection of Musée de  
Cluny  
Entered in Sèvres museum in  
1938  
18<sup>th</sup> c.

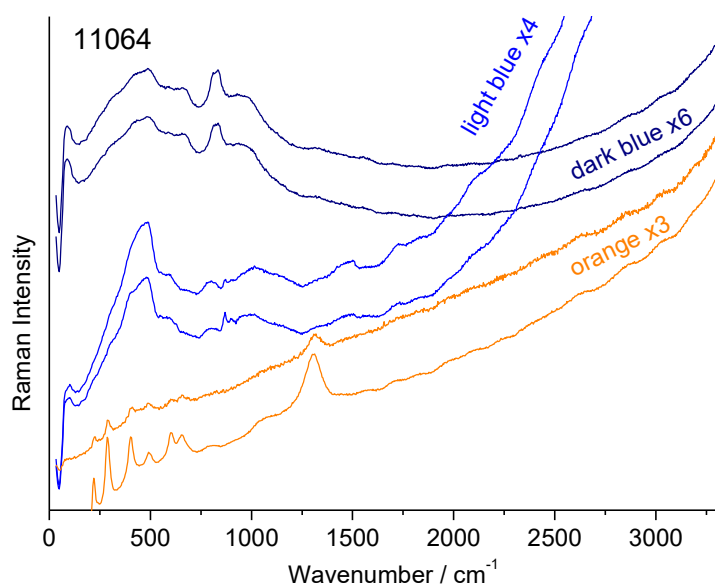
MNC 19944  
(singing angel)



MNC 19944  
(singing angel)



MNC 11064



9.4x8.8 H12.2

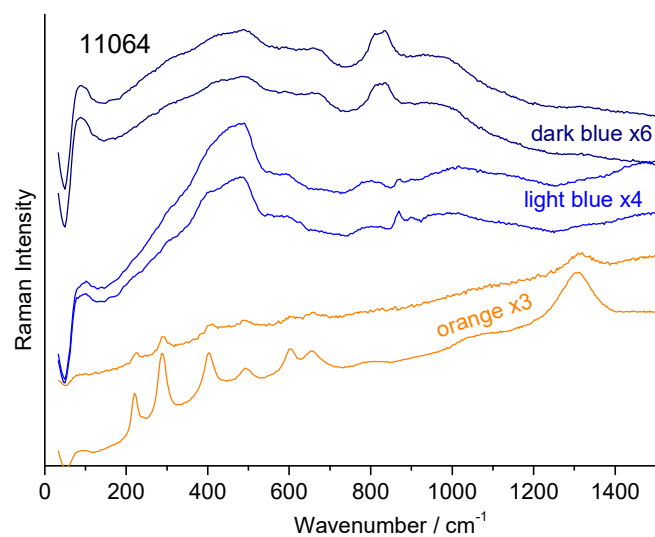
Gift in 1902 of Eléonor Dècle

3 enfants géomètres et astronomes

3 geometer and astronomer

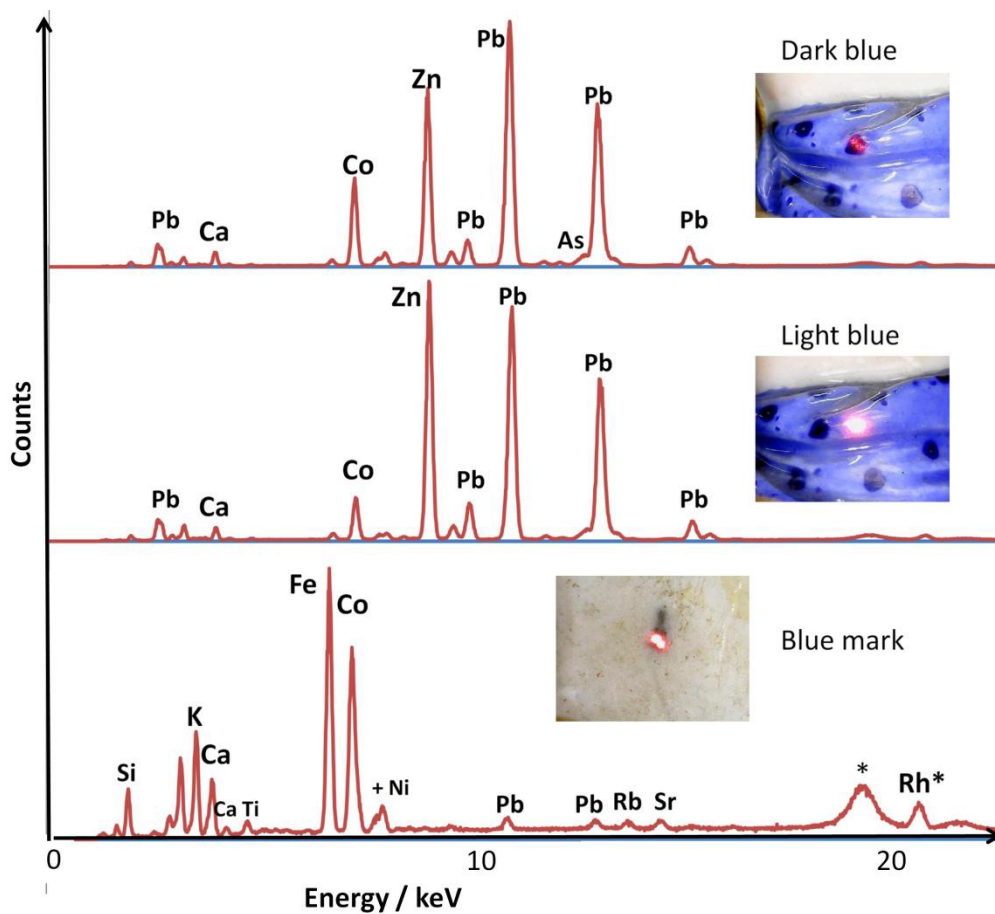
children group

18th c.?

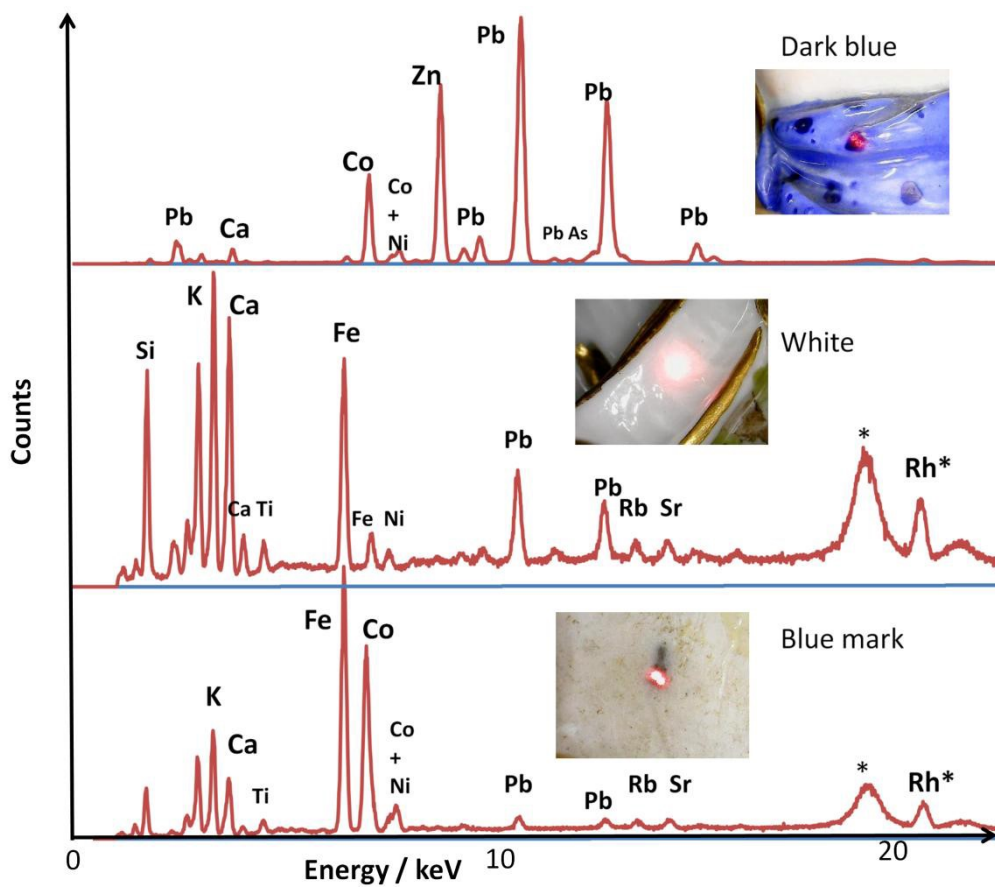


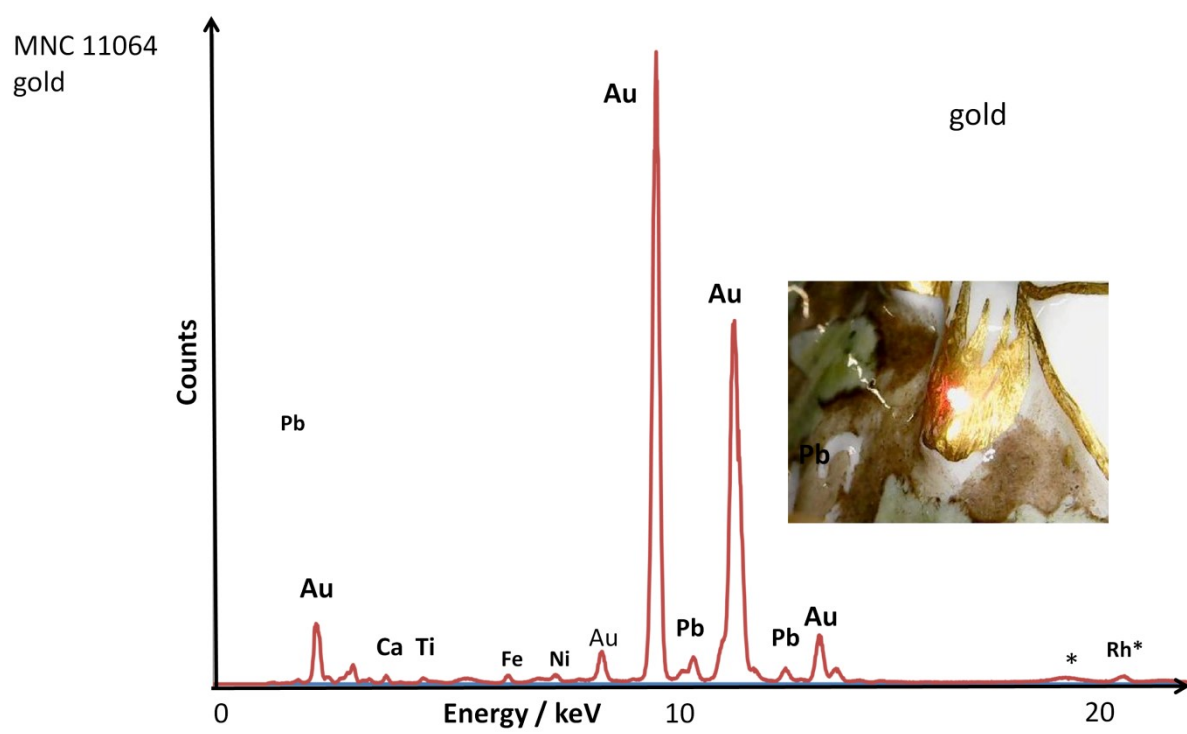
B

MNC 11064  
(Three  
geometer  
and astronomer  
children group)

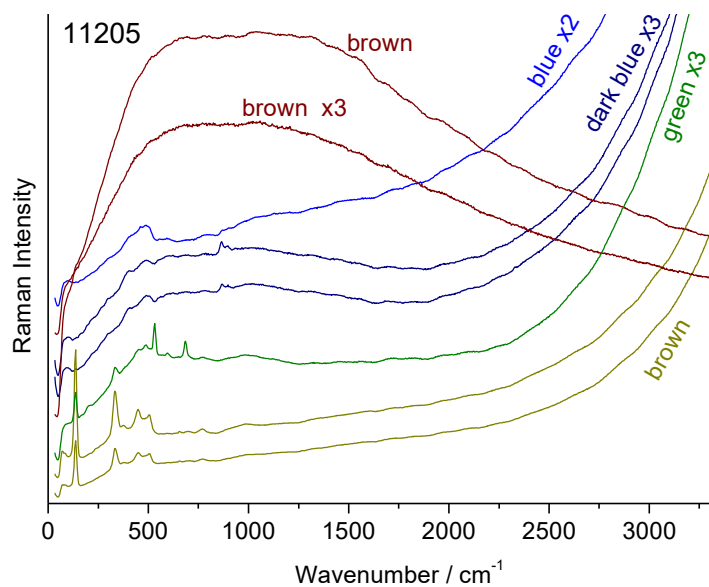


MNC 11064  
(Three  
geometer  
and astronomer  
children group)

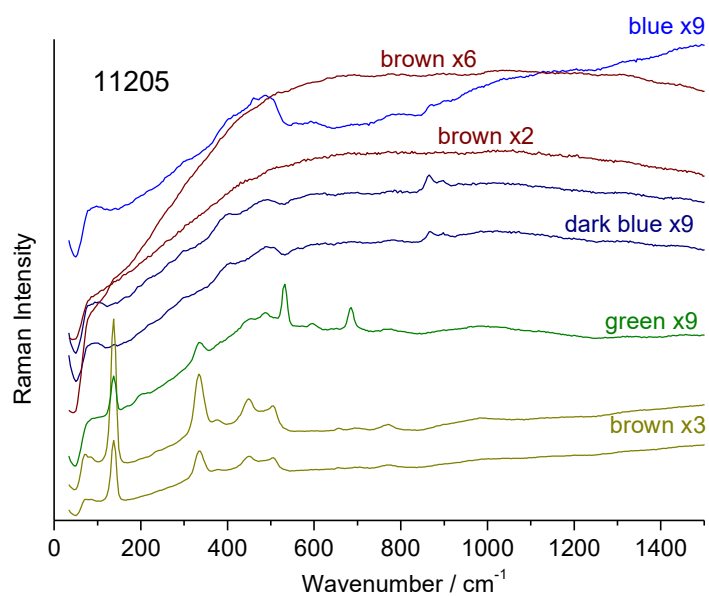




MNC 11205

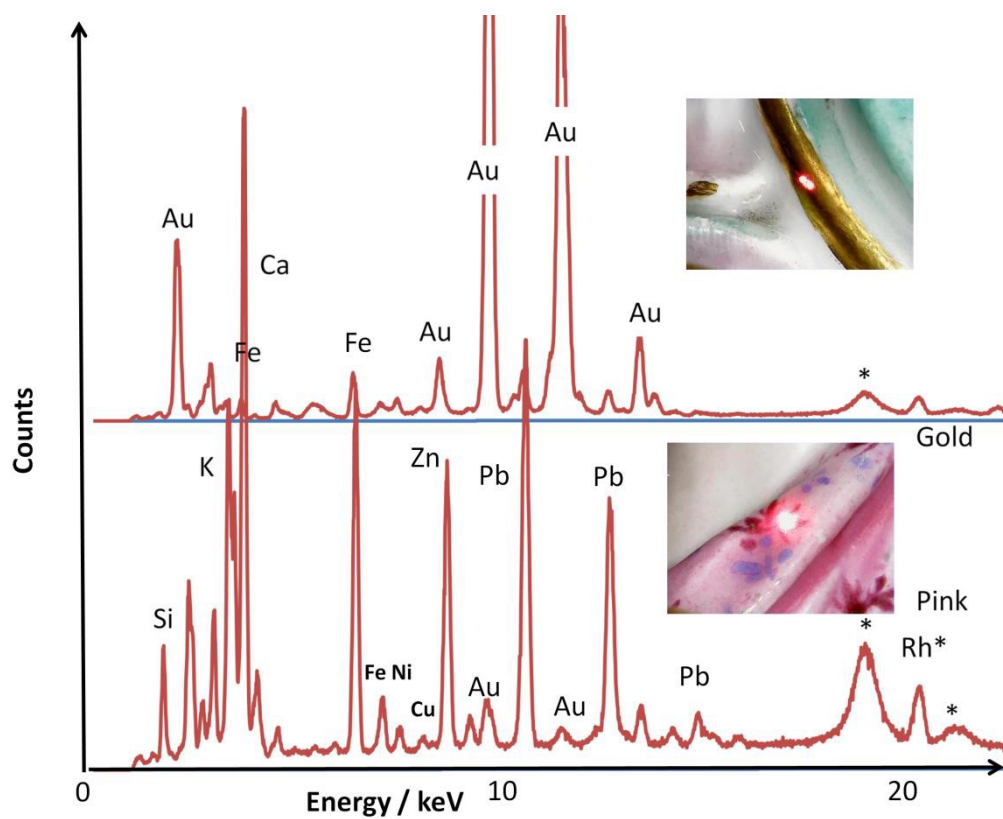


Bacchus & bacchante  
c.a. 1760, Kästner period  
(1740-1775)  
25x19.5 H27.2  
Gift in 1902 by Eléonore Dècles

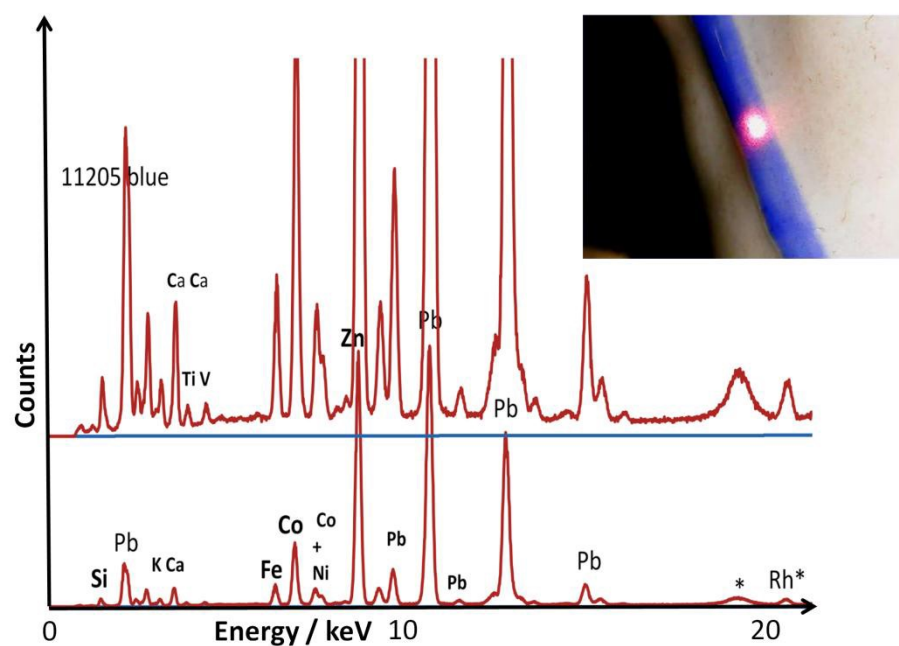




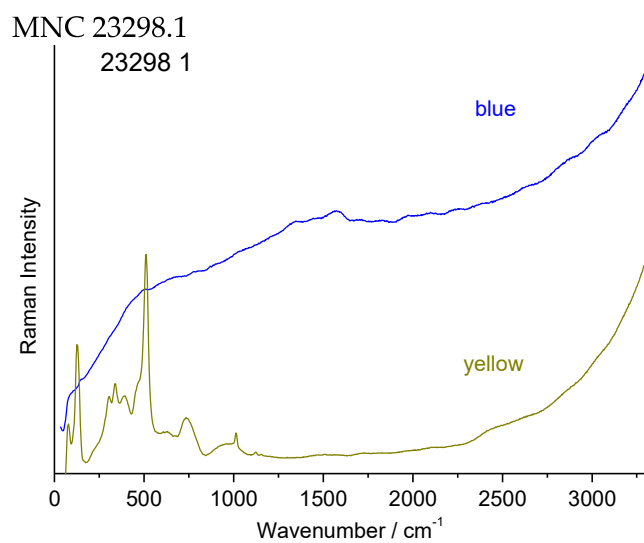
MNC 11205  
Kaendler  
Bacchus &  
bacchante group  
~1760



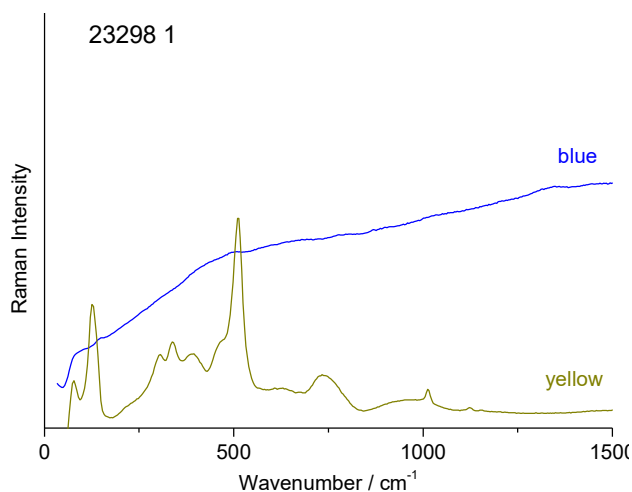
MNC 11205  
(Bacchus &  
bacchante  
group)



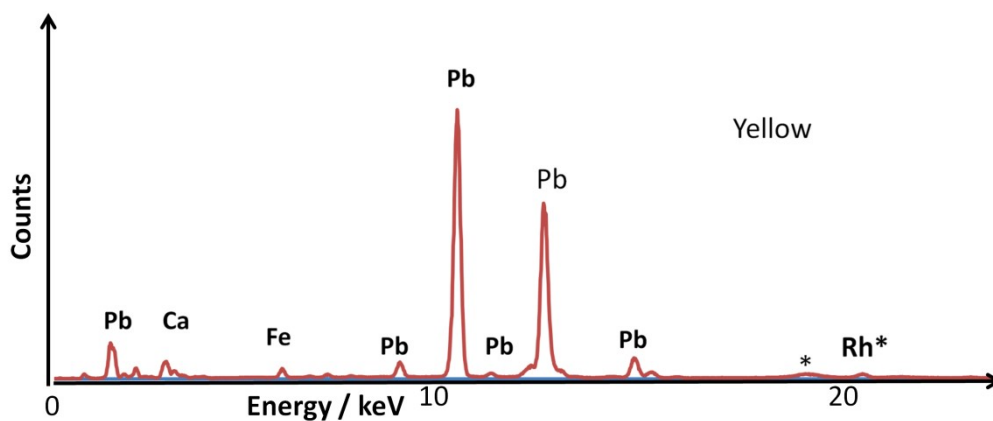




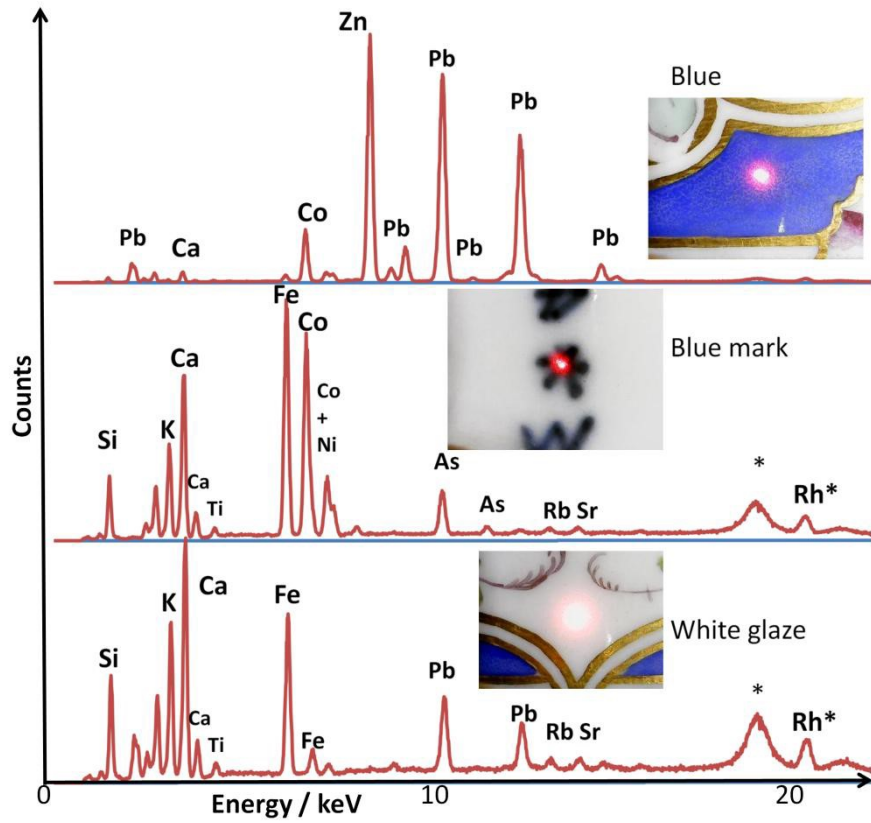
Écuelle  
Bowl  
c.a. 1774 to 1814 ( Marcolini production)  
Export pour Turquie  
Exportation for Turkish market  
Gift of Joseph Soustiel, 1967  
12x12 H10



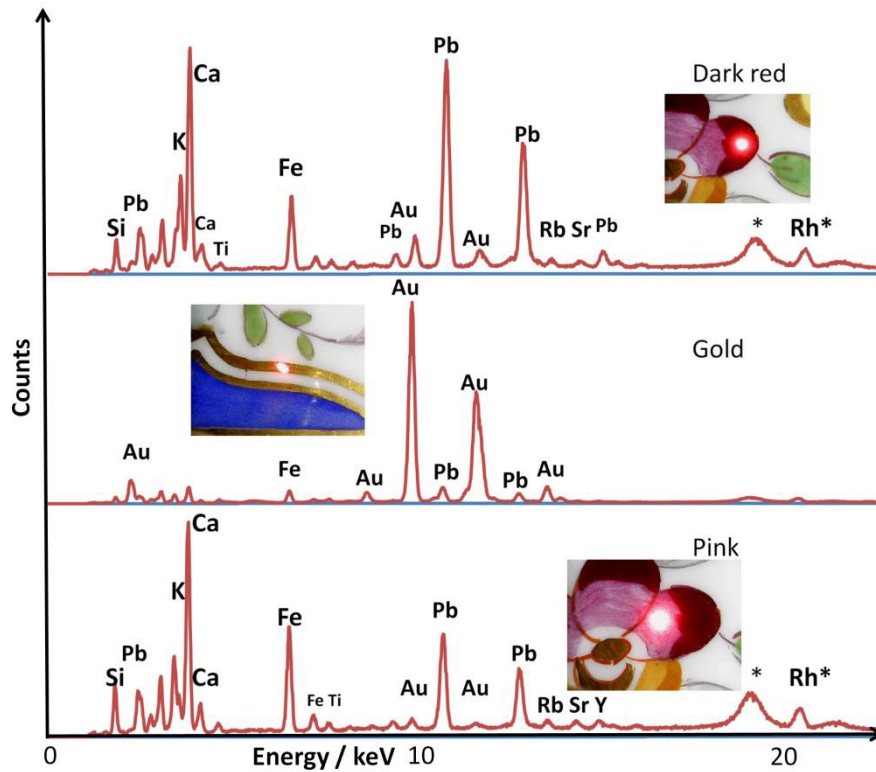
MNC 23298.1  
(cup for Turkish  
market)  
1774-1814



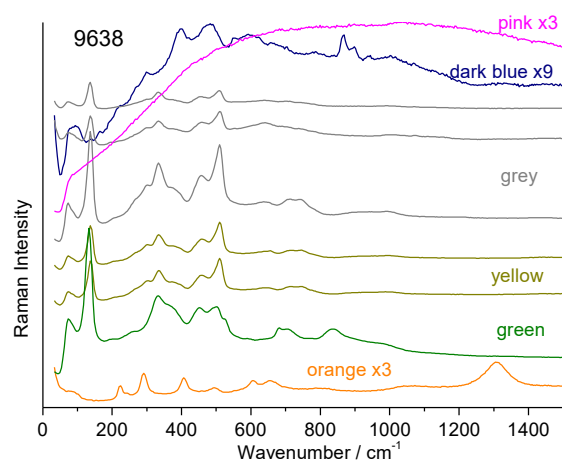
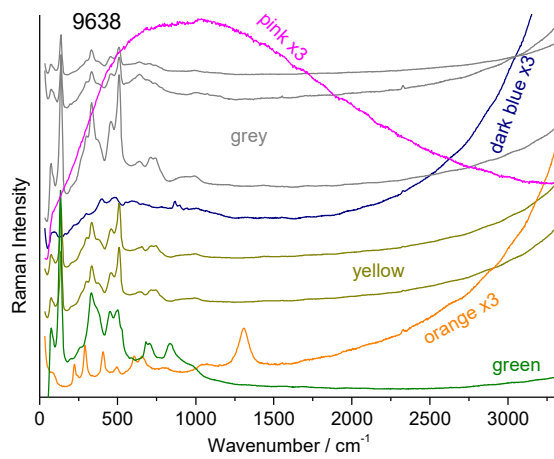
MNC 23298.1  
(cup for Turkish  
market)  
1774-1814



MNC 23298.1  
(cup for Turkish  
market)  
1774-1814



MNC 9638 ol

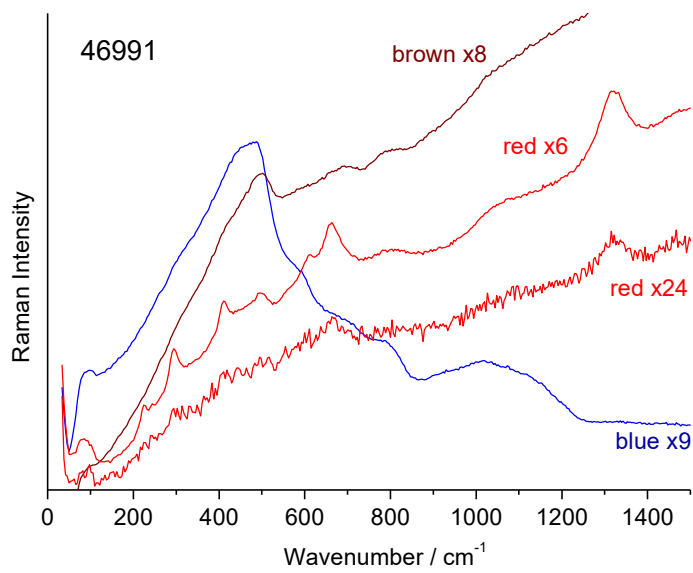
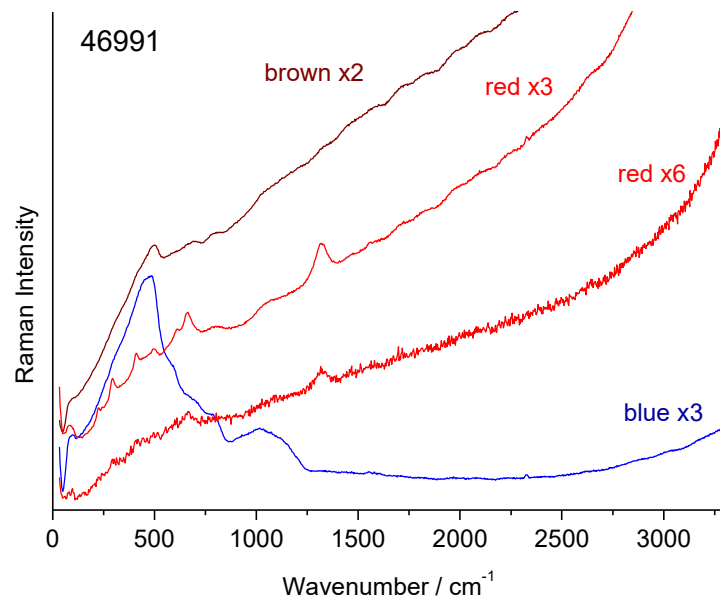


18th c.

21.8x21.8 H10.3

Acquisition in 1894 from Tamelier

MNC 469.9.1



c.a. 1806  
9x6.7 h10.5  
coffee cup with painting copy  
(Marcolini period)

469.9.1 lue

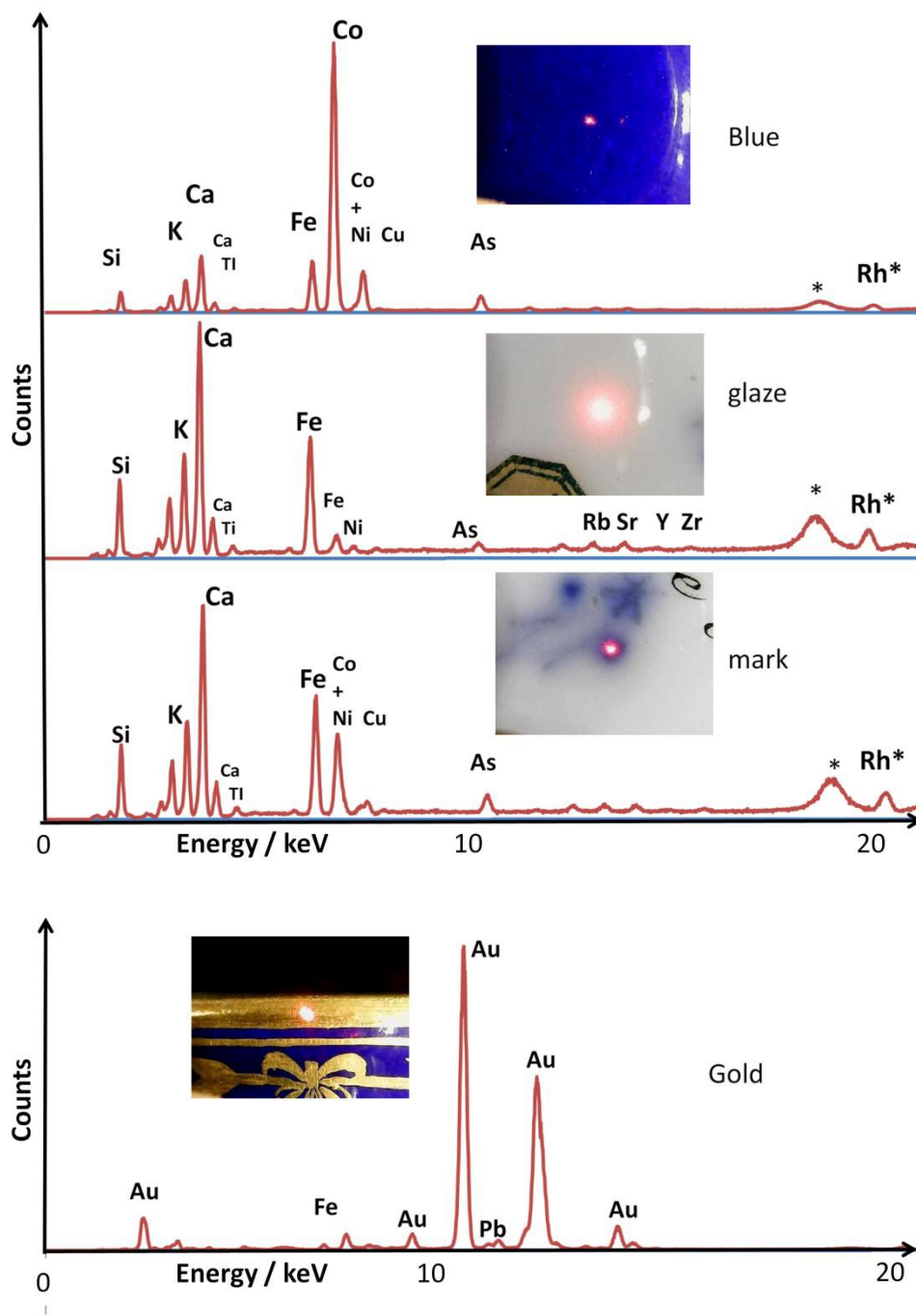


469.9.1 glaze

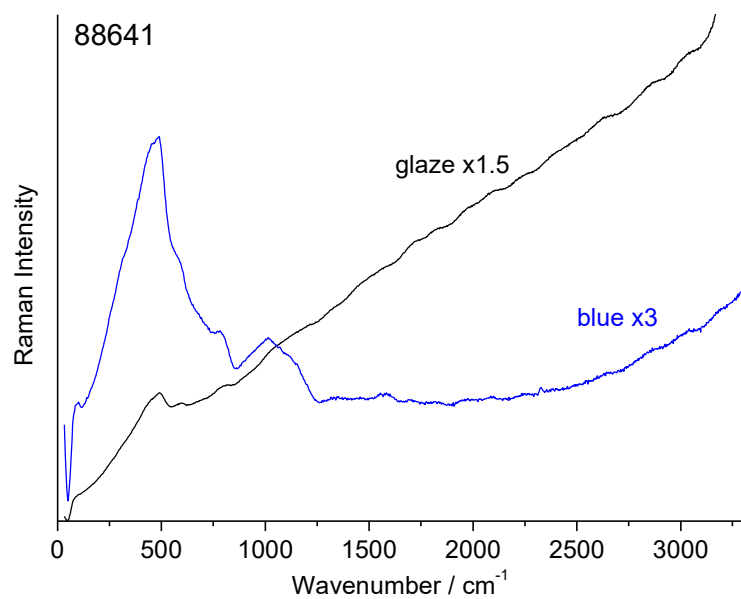
469.9.1 mark



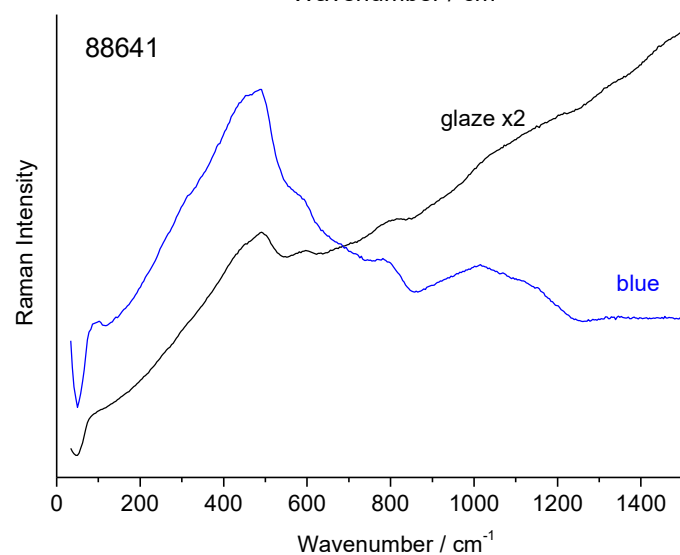
469.9.1 gold



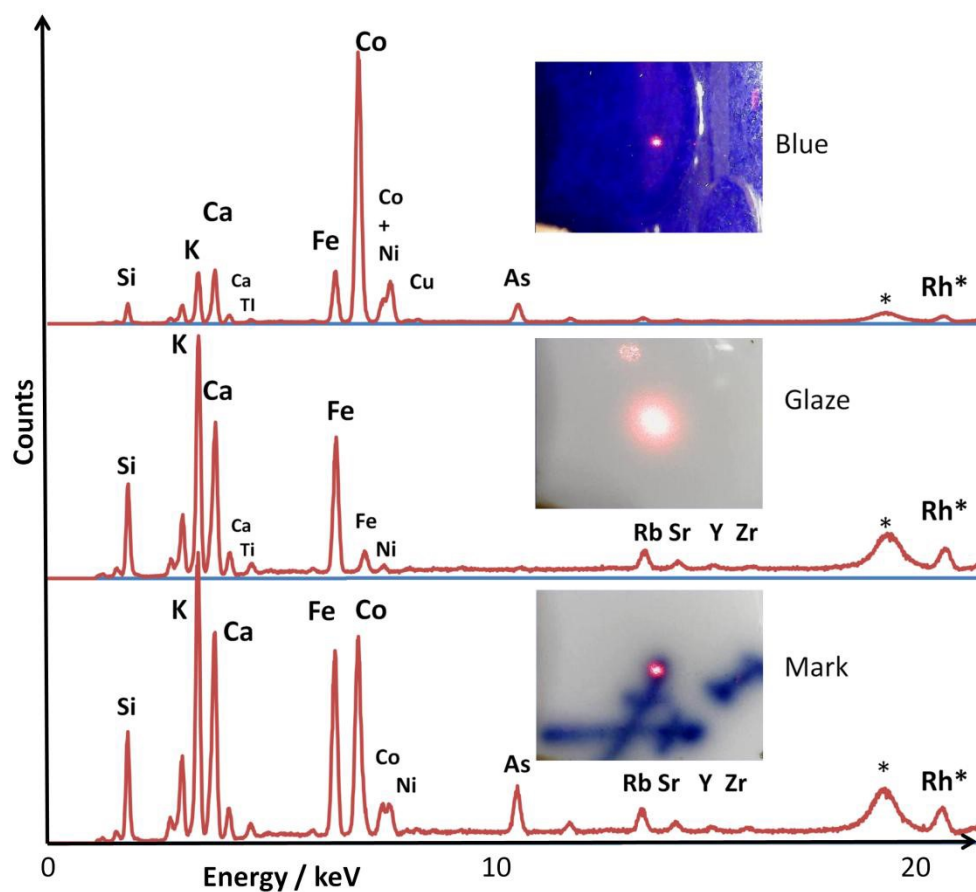
MNC 886.4.1



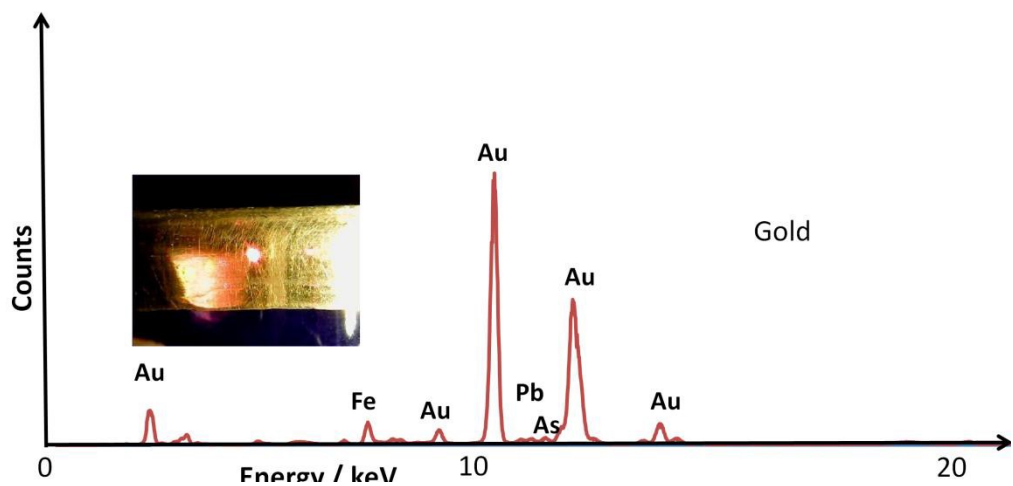
Tasse litron  
Coffee cup  
9x6.5 h6.5  
end of 18th c. -beginning  
of 19th c.



MNC 886.4.1  
(coffee cup)



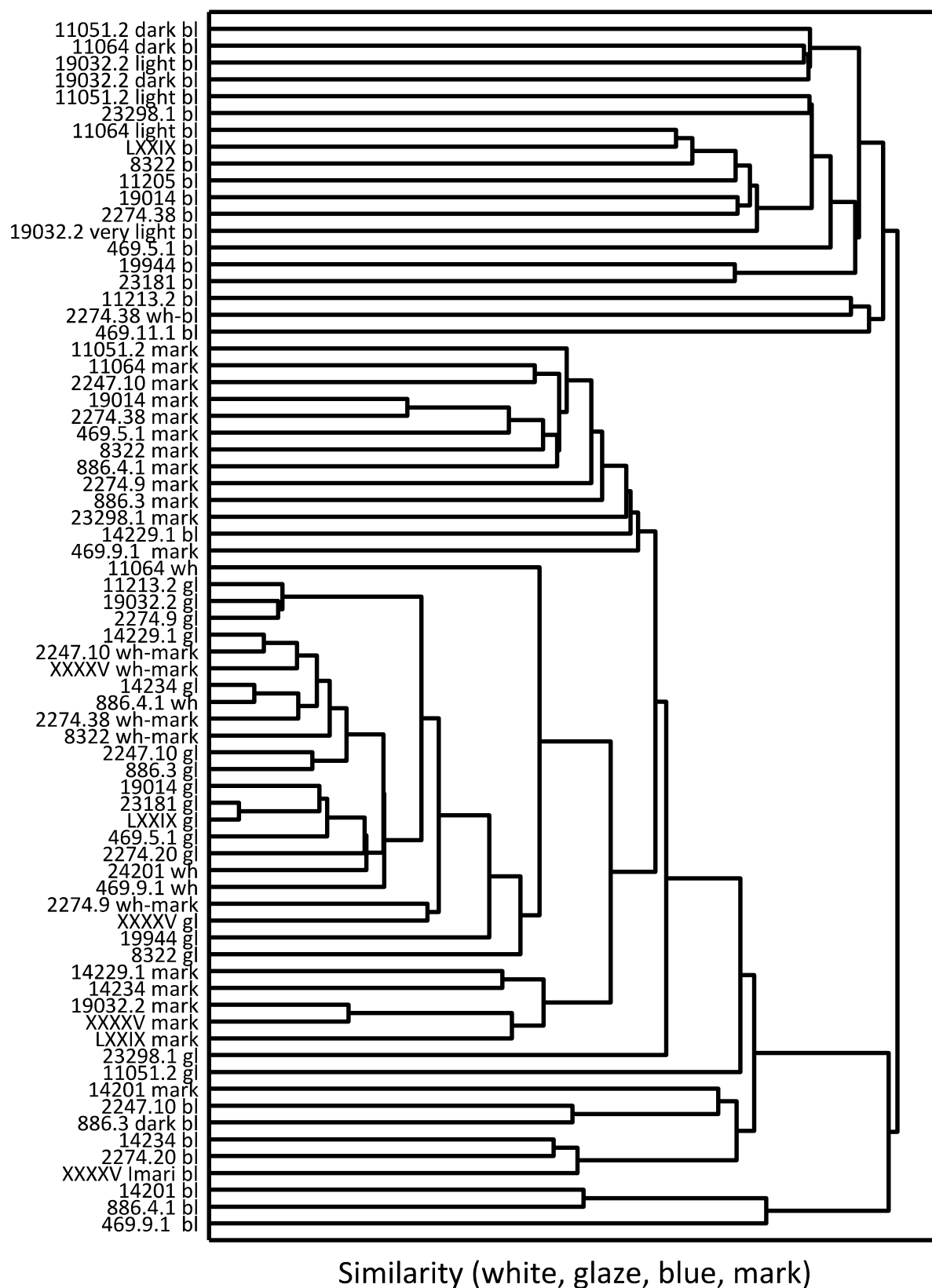
MNC 886.4.1  
(coffee cup)

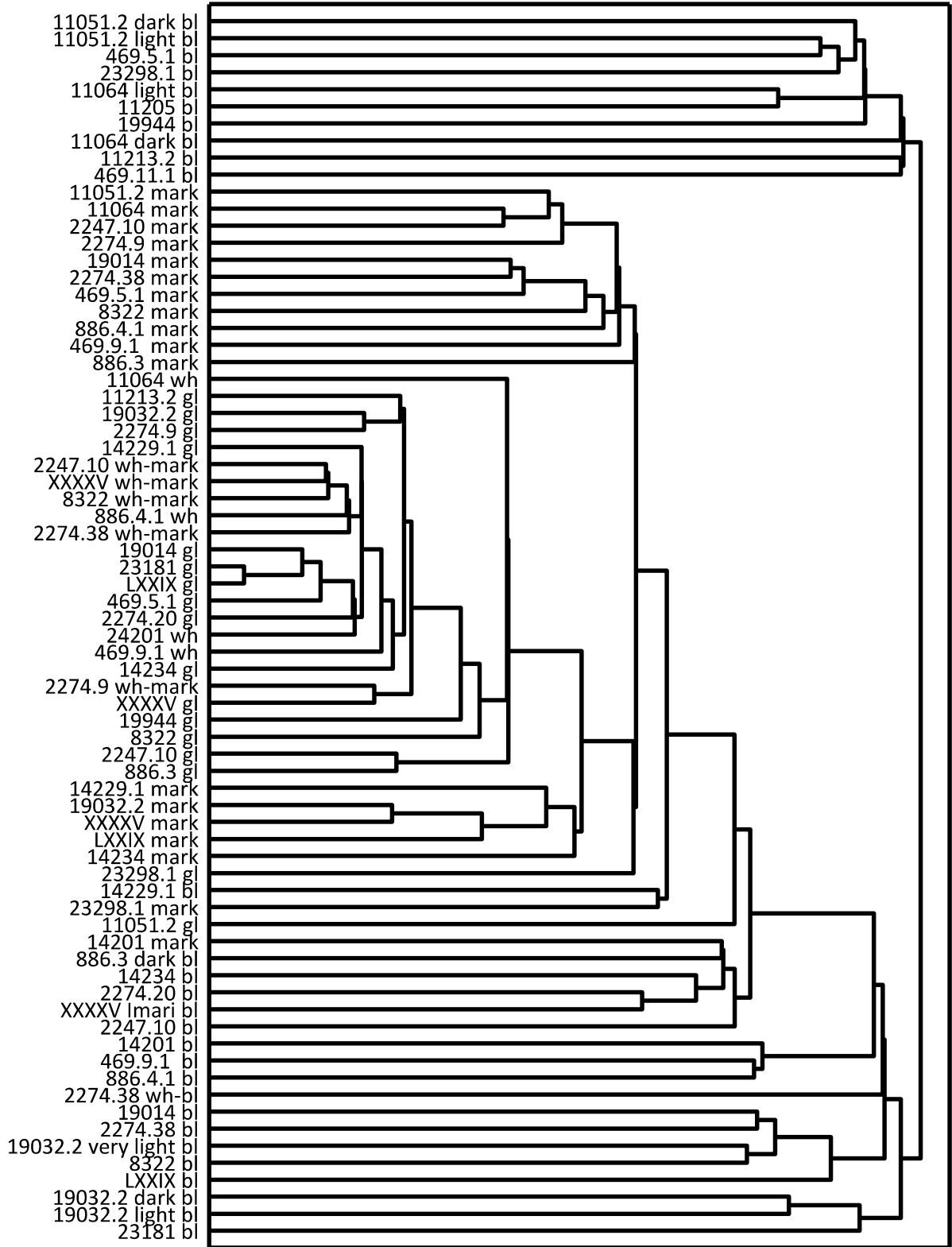




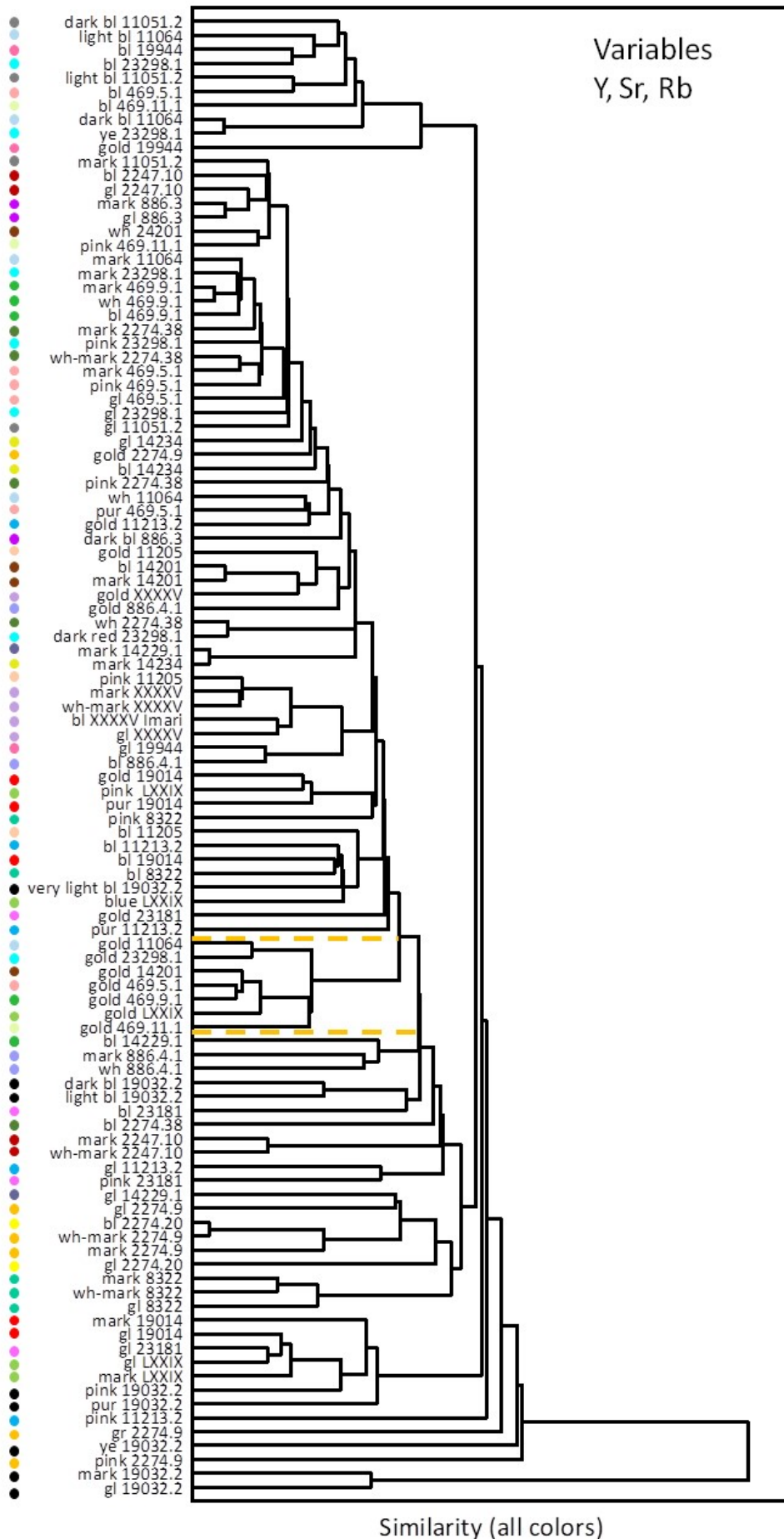


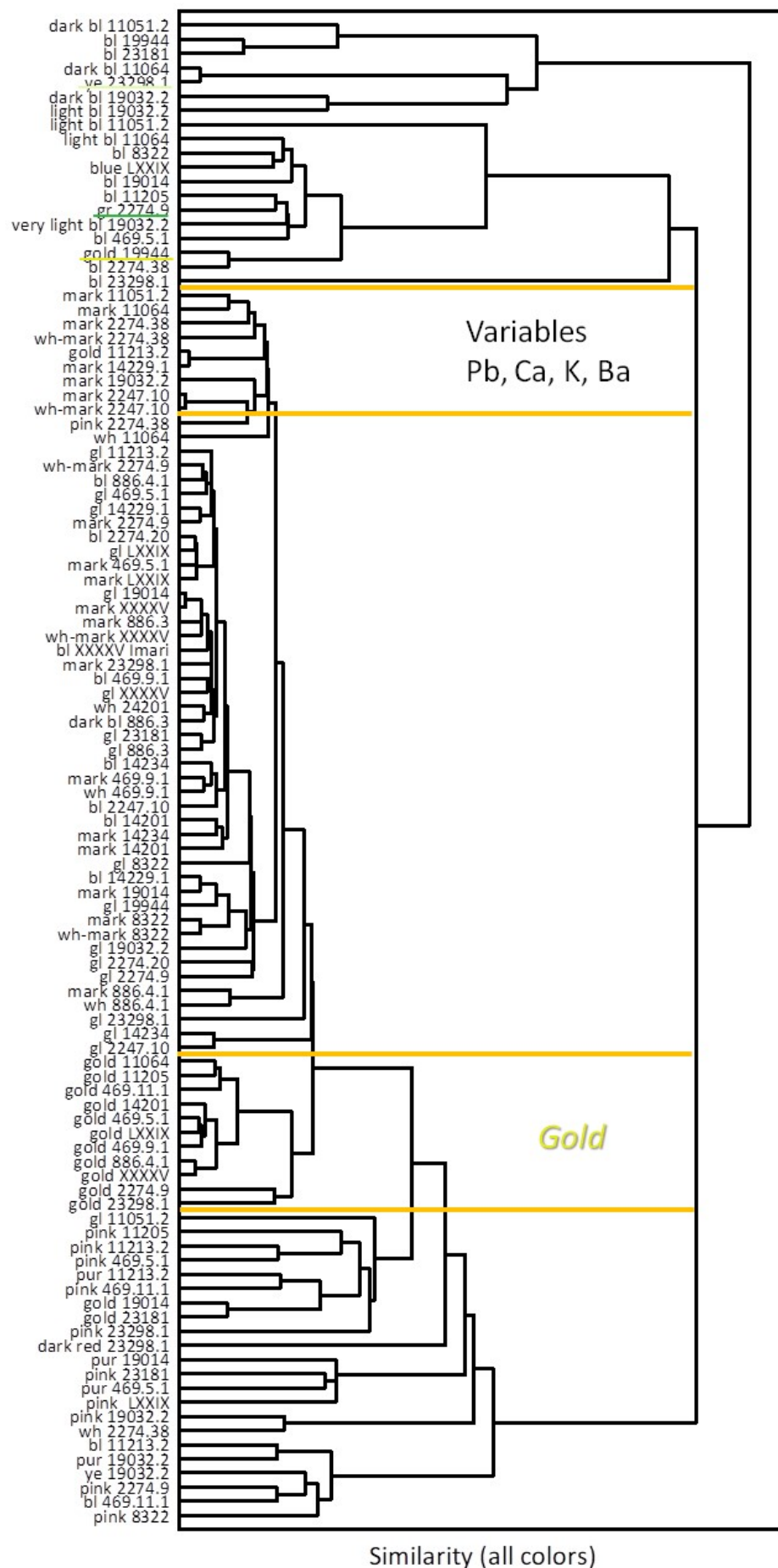
**Figure S3:** Diagrams of hierarchical similarity constructed with all the variables - or those indicated for areas indicated.





Similarity (white, glaze, blue, mark)





Blue

Variables  
Sn, Zn, As

Pink

Gold

Gold

Pink

Similarity (all colors)

