Analytical techniques

The most widespread instrumental techniques of chemical analysis in cultural heritage studies

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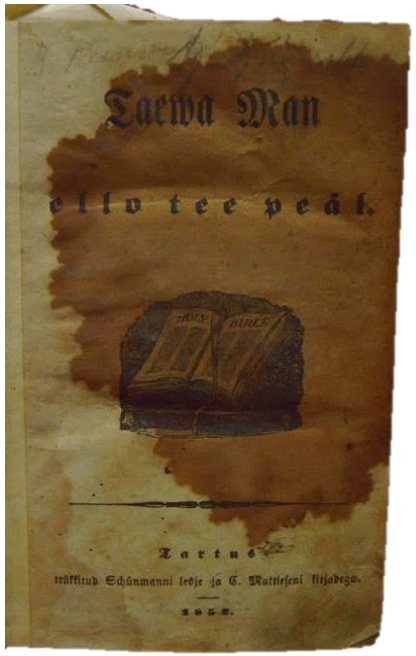
Why we need to analyse?

Altar of the Church of the Holy Spirit in Tallinn (15th c.)

Thoroughgoing material analysis important for art historical, conservation and material science point of view

Photo: Conservation and Digitization Centre Kanut



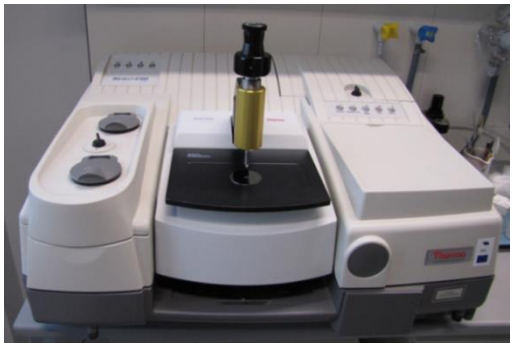
Book „Taewa Man ello tee peäl“ (1852)

What material is on the paper sheet of the book?

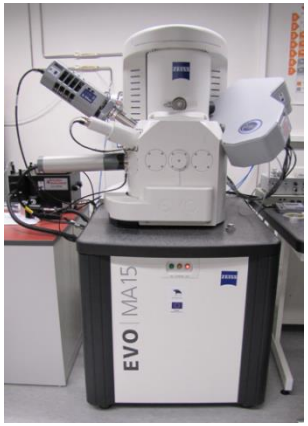
Carpet from the Estonian National Museum

Problems with the colour changing of the dyes.

Optical microscope

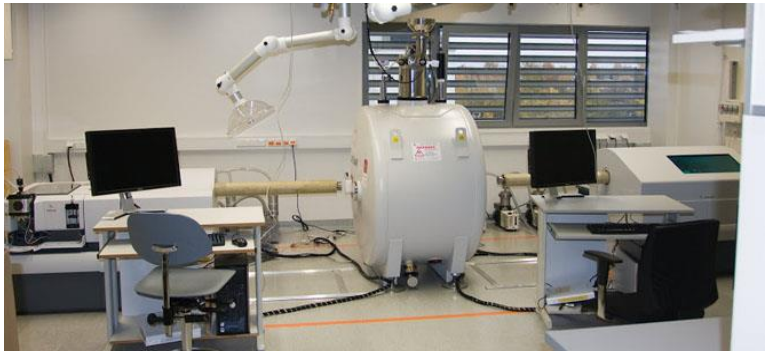


ATR-FT-IR spectroscopy



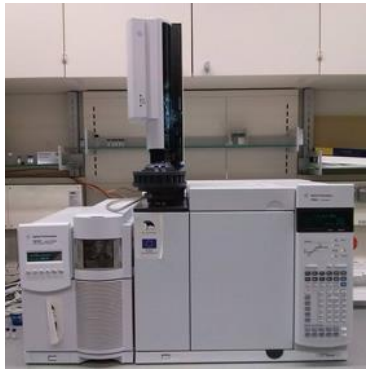
Scanning electron microscopy (SEM)
energy dispersive spectroscopy (EDS)

X-ray fluorescence spectroscopy (XRF)

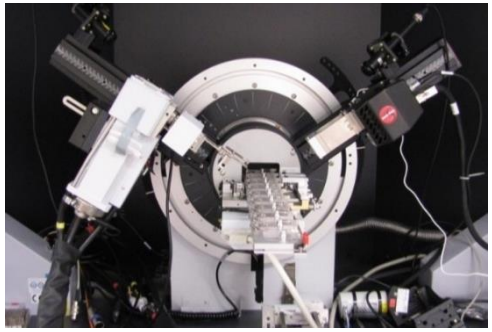


ESI-, APCI-,MALDI-FT-ICR-MS

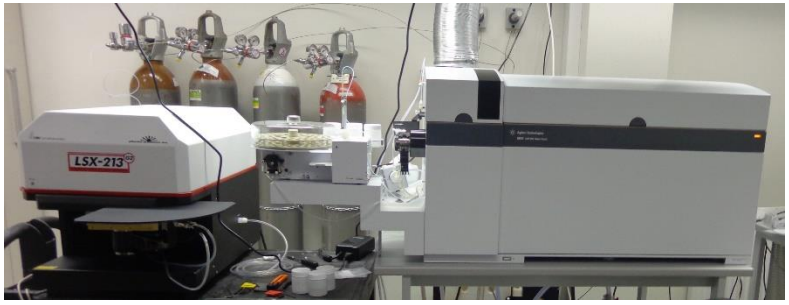
ESI - electrospray ionization;
APCI - atmospheric pressure chemical ionization;
MALDI - matrix-assisted laser desorption/ionization;
FT-ICR - Fourier transform ion cyclotron resonance.



Gas chromatography-massspectrometry (GC-MS)



X-ray diffraction (XRD)



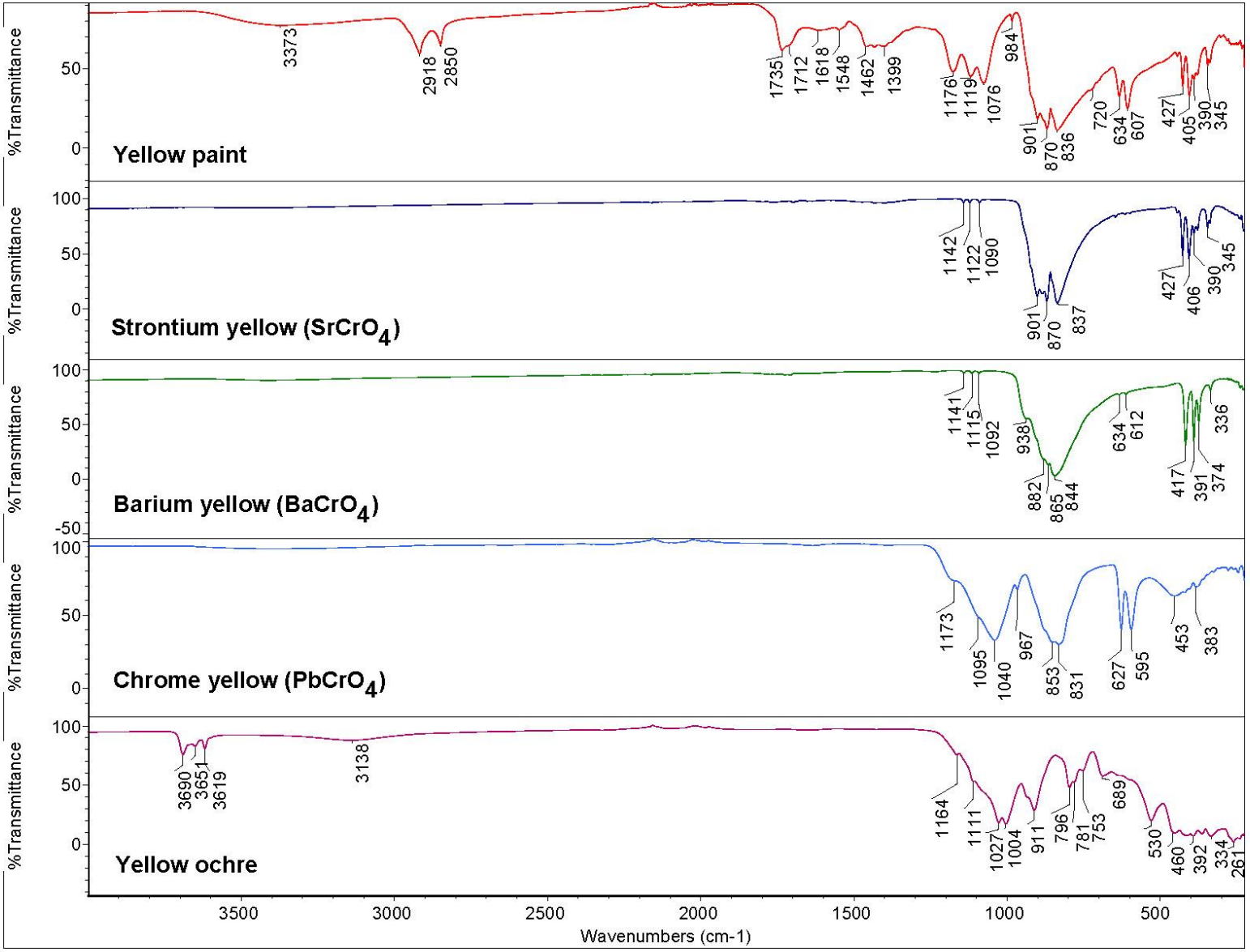
(Laser ablation) inductively coupled plasma mass spectrometry ((LA)-ICP-MS)

Liquid chromatography-massspectrometry (LC-MS)

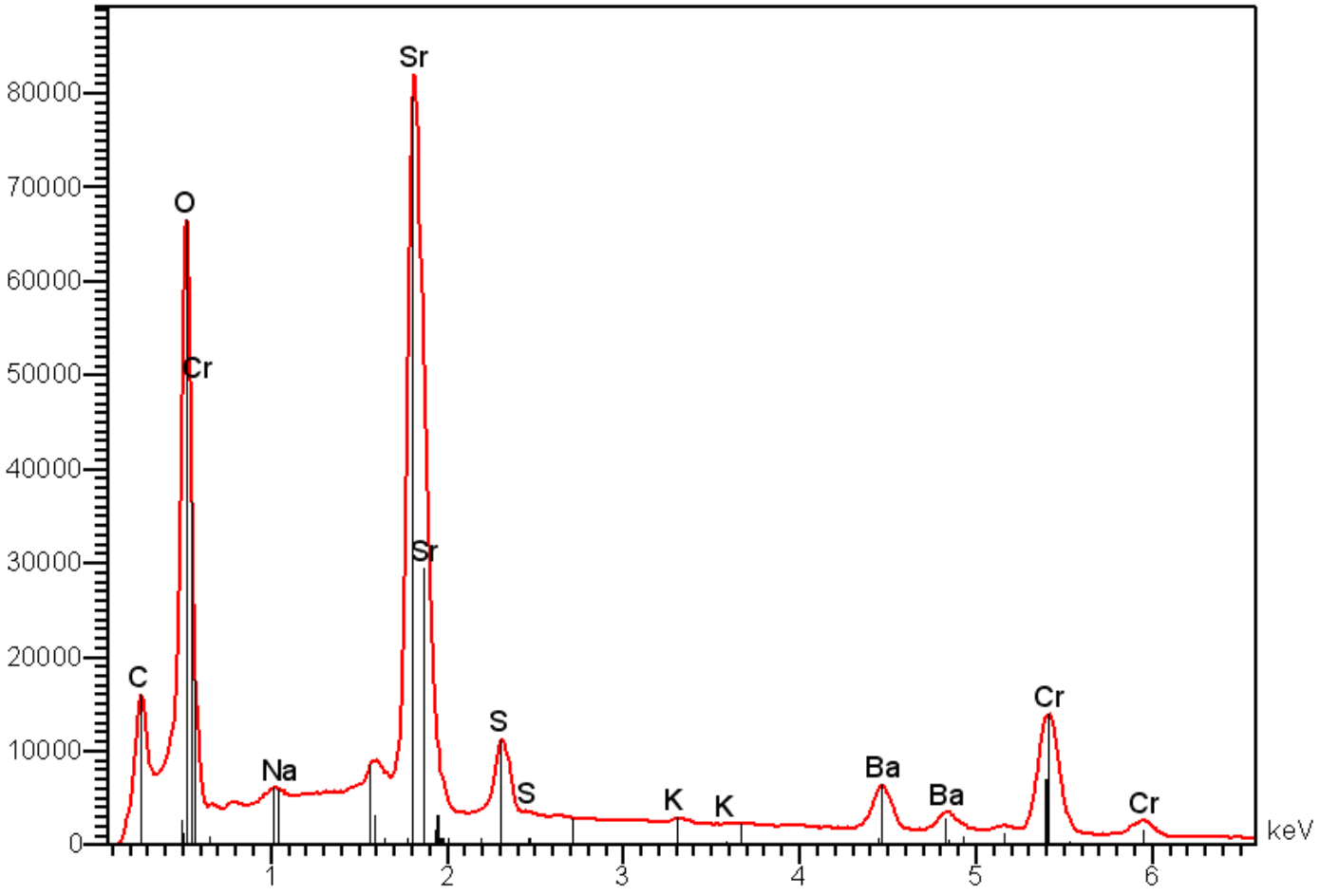
Unknown author's painting

- What is the yellow pigment?

ATR-FT-IR spectra



SEM-EDS spectrum



Results

Composition of yellow paint:

- **Pigment:** Strontium yellow ($SrCrO_4$)
- **Filler:** Barium sulphate ($BaSO_4$)
- **Binder:** oil

Summary

A great variety of instrumental techniques are available

The best results are obtained when different analytical techniques are used in combination

Any background information about the object is valuable!