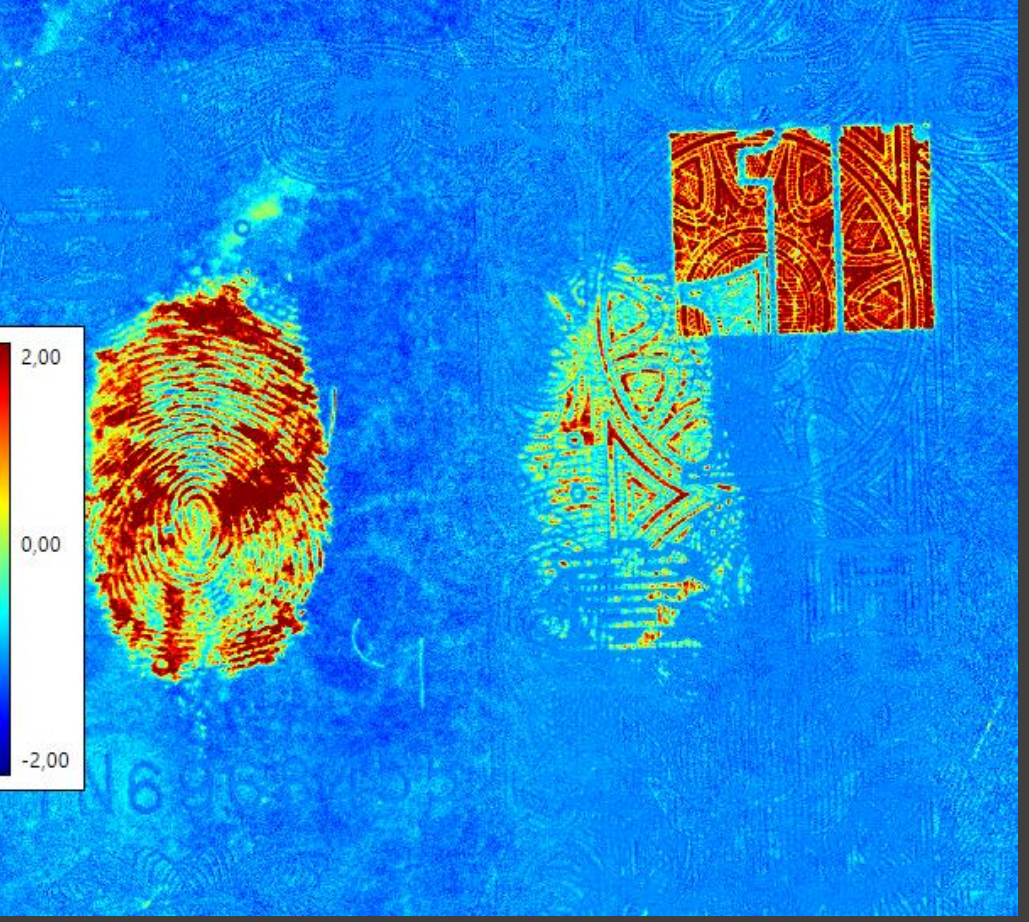
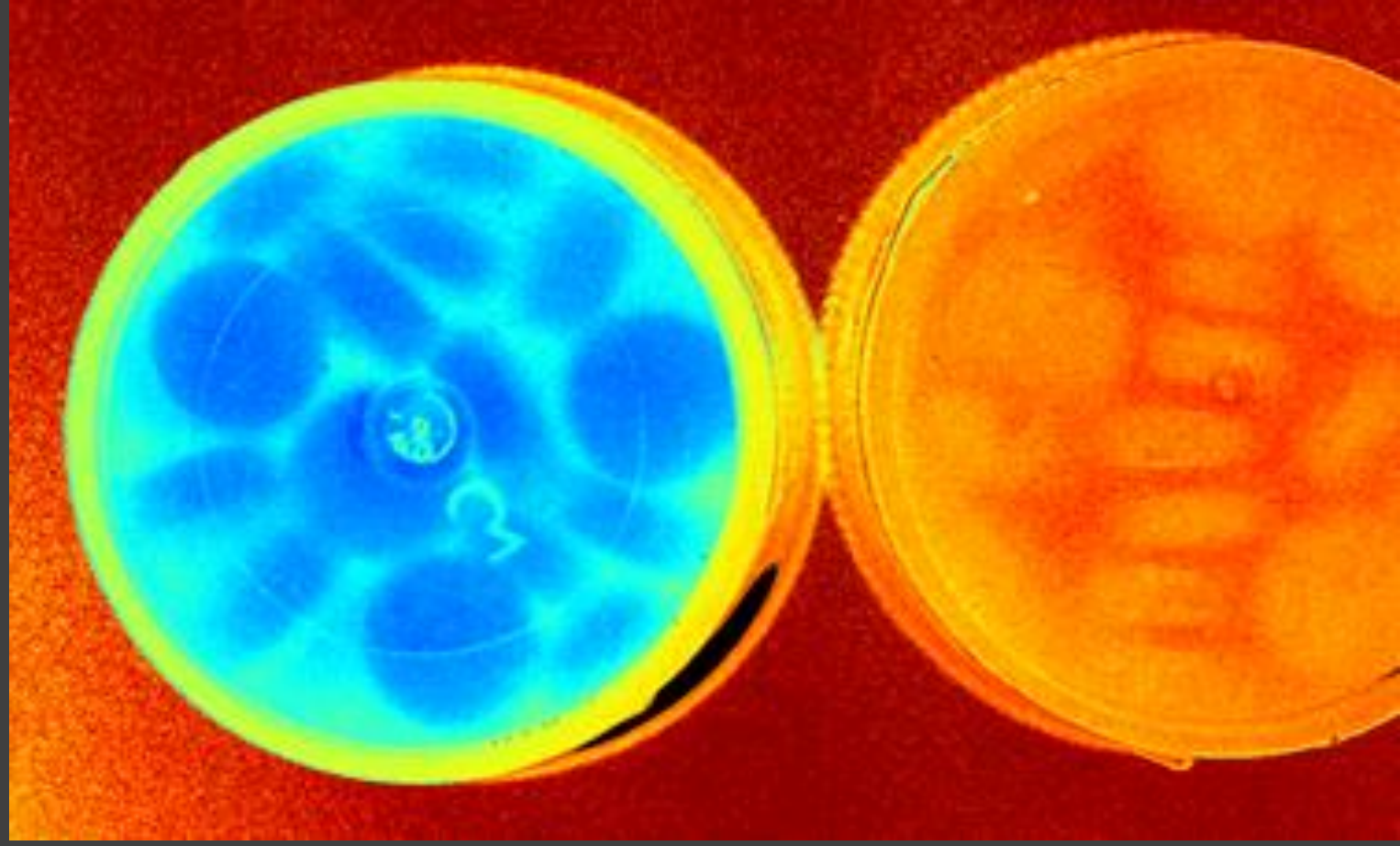
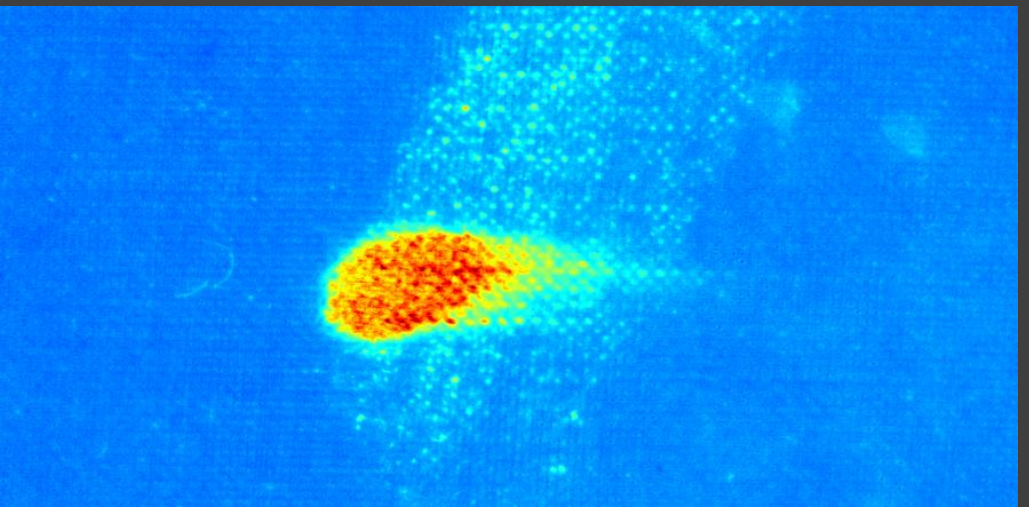




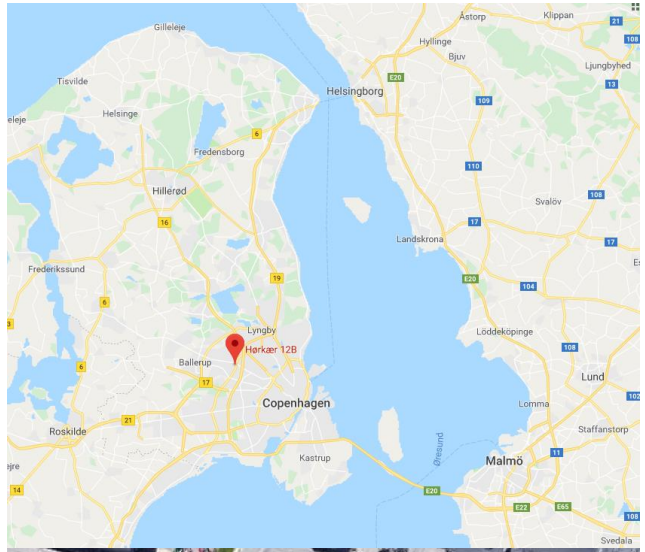


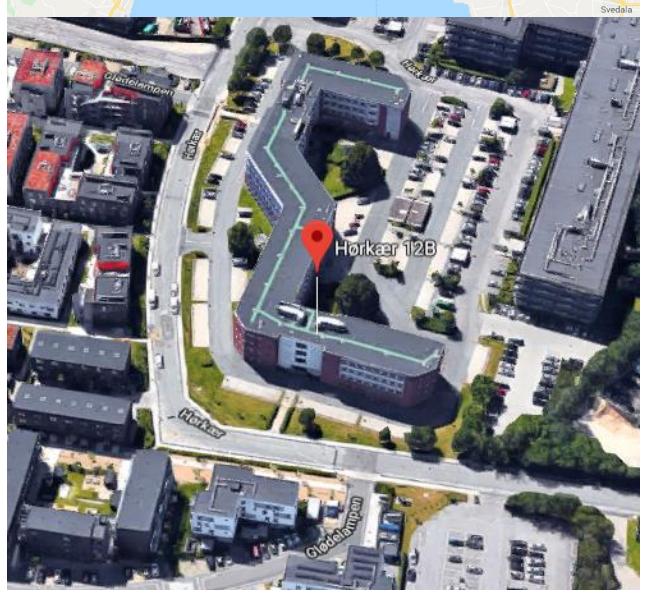
Videometer forensic applications

Spectral imaging made easy

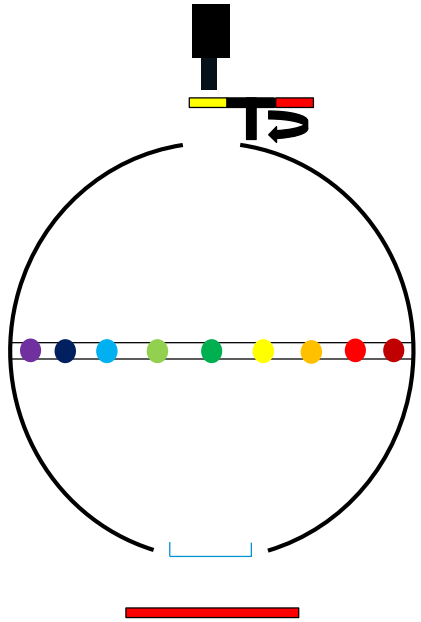
Videometer A/S

- Spectral imaging company
- Founded 1999
- Products
  - Lab instruments,
  - Turn-key in-line systems, and
  - R&D projects
- App. 640 imaging R&D projects since 2000
- In-line 24/7 spectral imaging since 2002
- Based in Copenhagen, Denmark
- Partnerships worldwide





LED band-sequential spectral imaging



Camera and lens

Emission filter changer

Integrating sphere

LEDs of multiple wavelengths

Sample is placed in target opening

Backlight or background

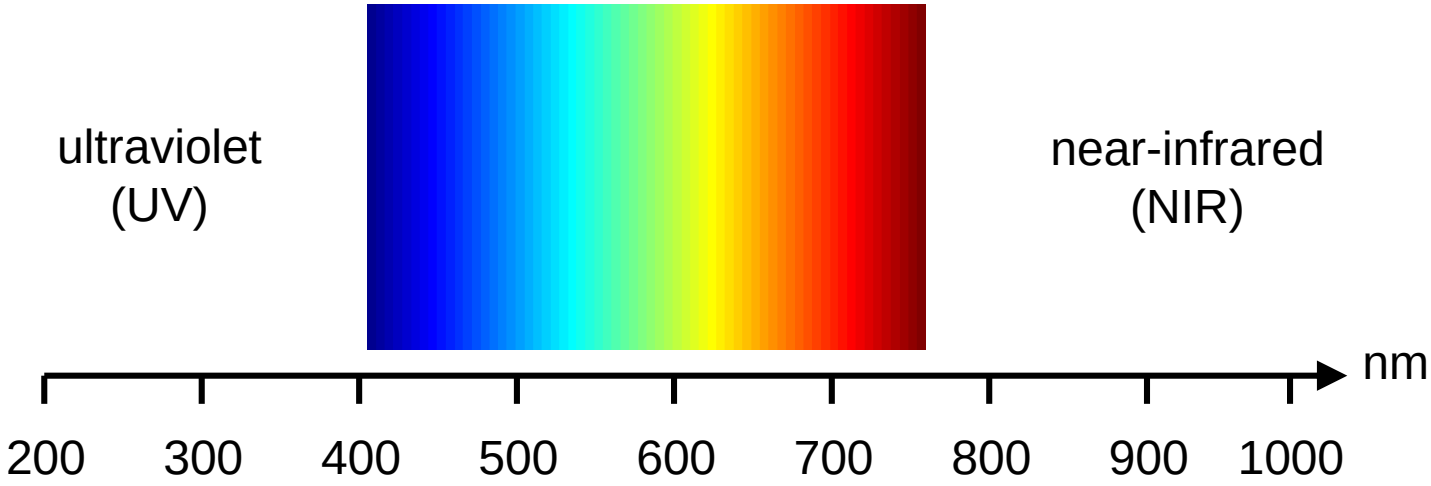
- LEDs: Stable, durable, large selection, rapidly developing technology
- Up to 20 different high-resolution bands acquired sequentially in 0.5-1.5 seconds
- May be combined with emission filters, backlight, and darkfield illuminant
- Combined **reflectance spectral imaging** and **fluorescence spectral imaging** possible!

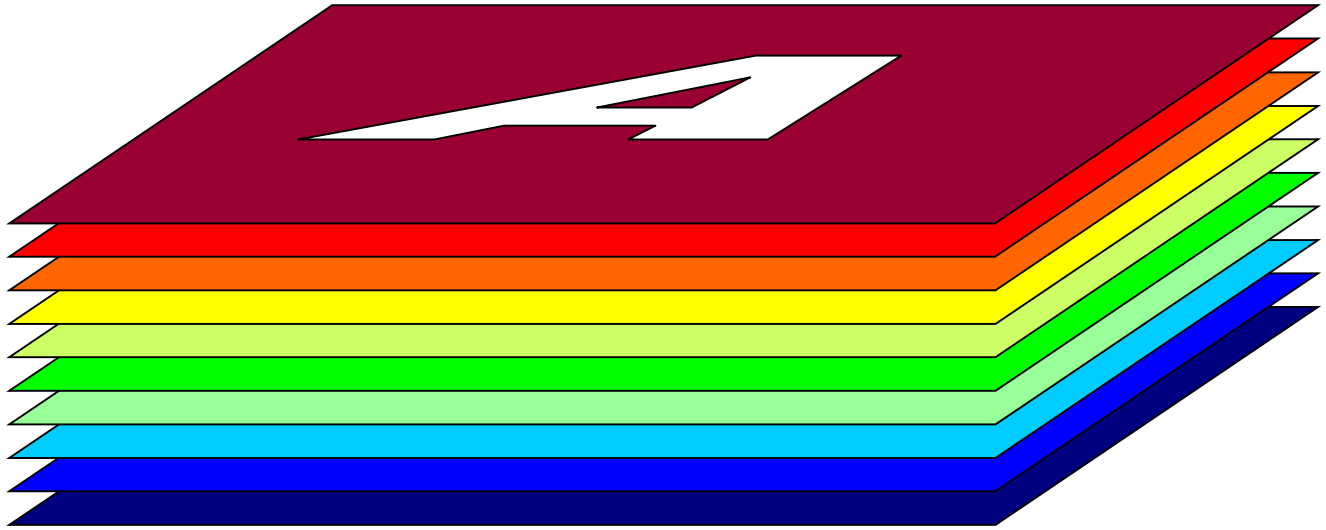
VideometerLab 4

Flexible lab and at-line instrument for spectral imaging

- 19-20 spectral bands in the range 365 nm to 970 nm
- 2192 × 2192 pixels per band, 40 µm (2992 x 2992 high-res option, 30 µm)
- Very homogeneous and diffuse illumination
- Strobed LED light source
- 10 seconds per sample including handling
- Optional backlight strobe
- Optional fluorescence bands
- Software for calibration, acquisition, and analysis
- Patented technology

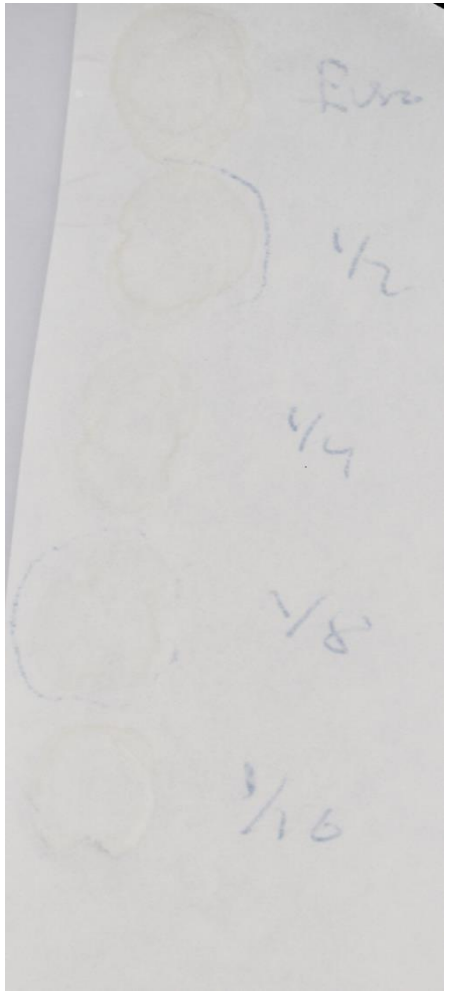
Spectral Imaging



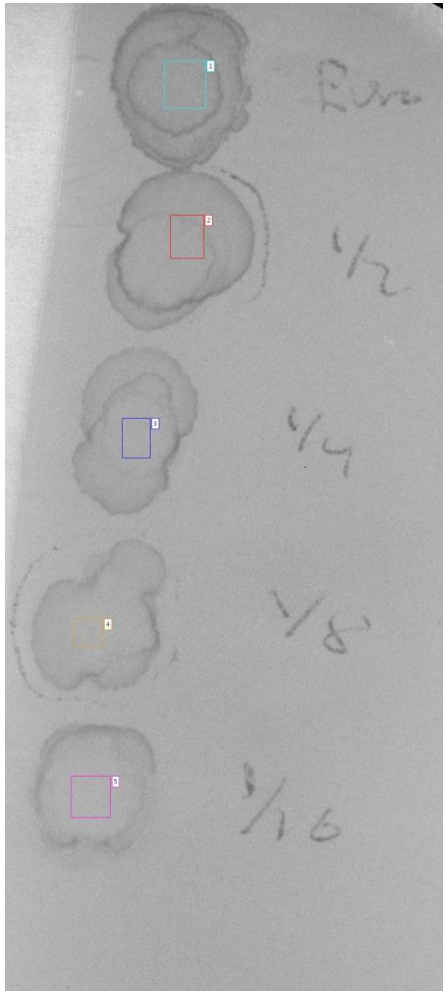


N images obtained at N specific wavelengths

Blood stains in 5 different dilutions

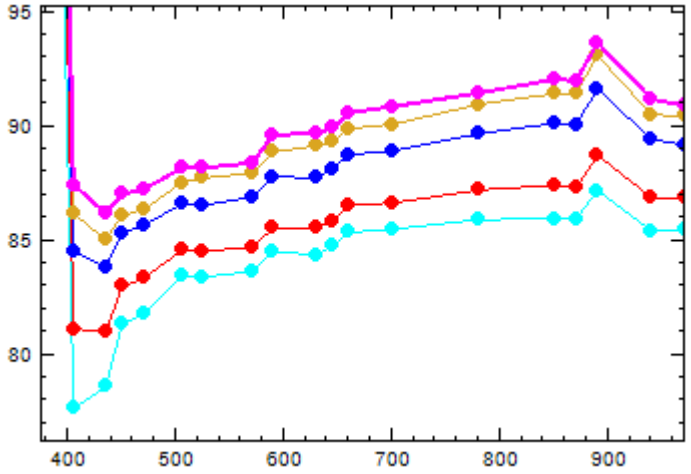


RGB

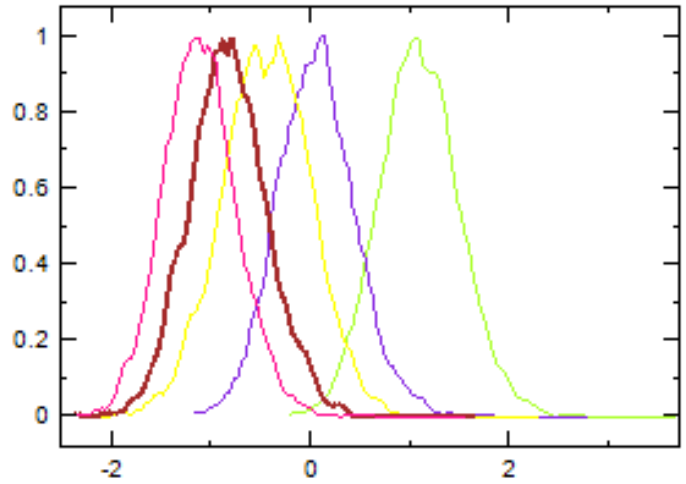


405 nm

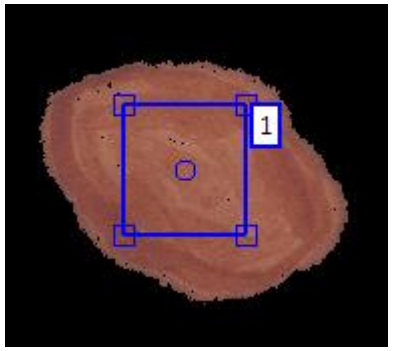
Spectrum

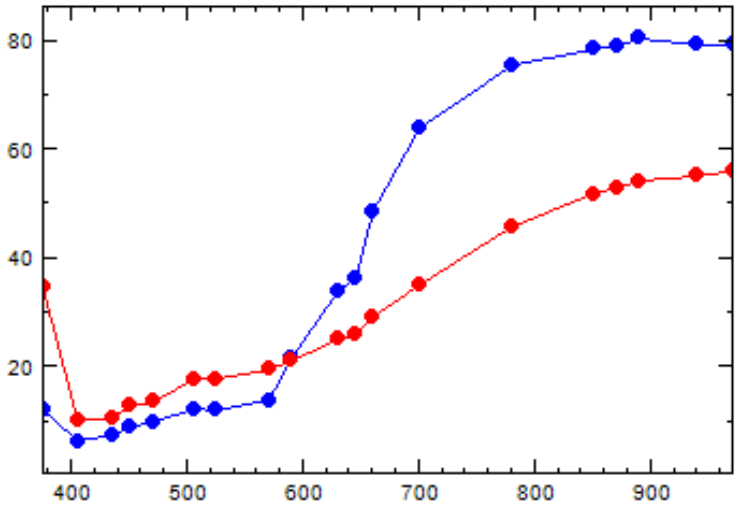


Blood index histograms



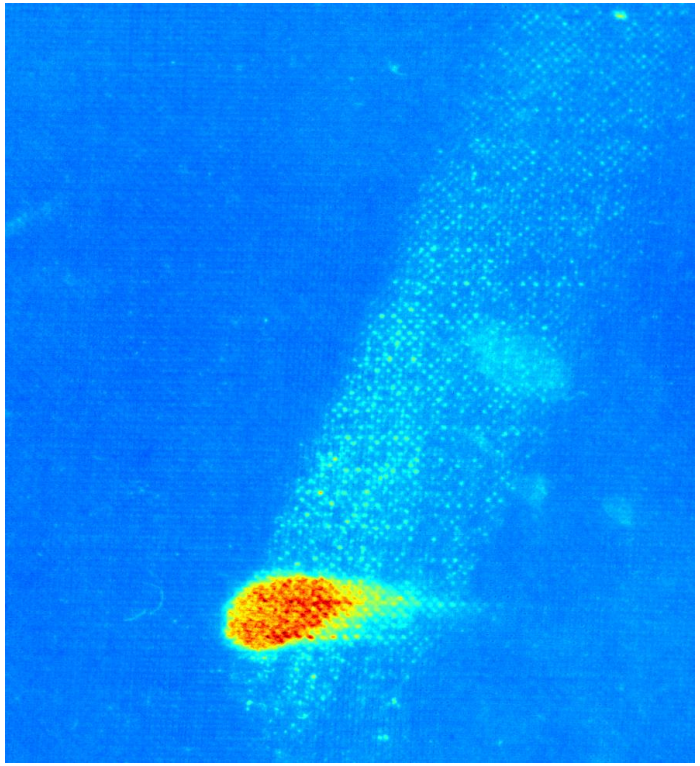
Blood on paper and fabric





Blood smear on fabric

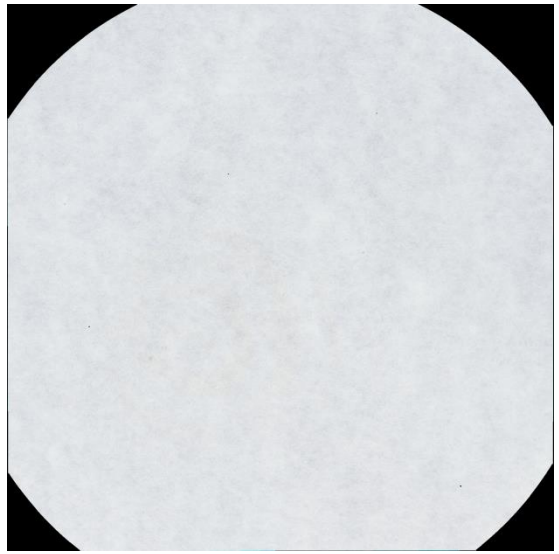
sRGB



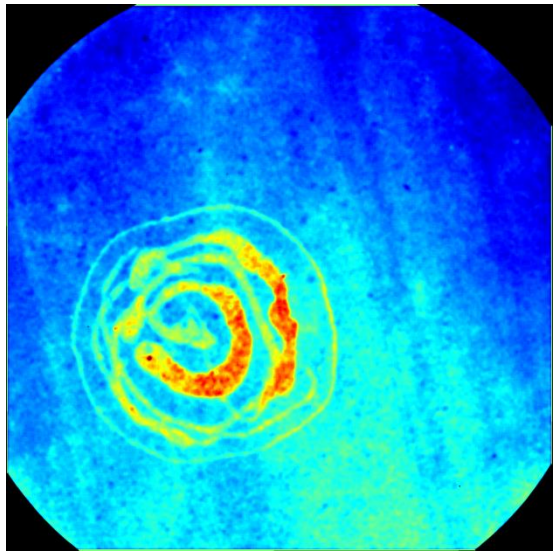
Blood index

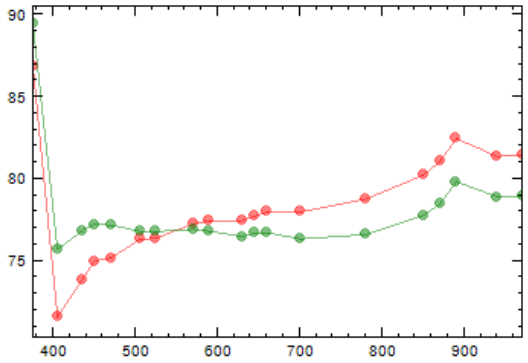
Saliva on paper

Saliva on paper



Saliva detector



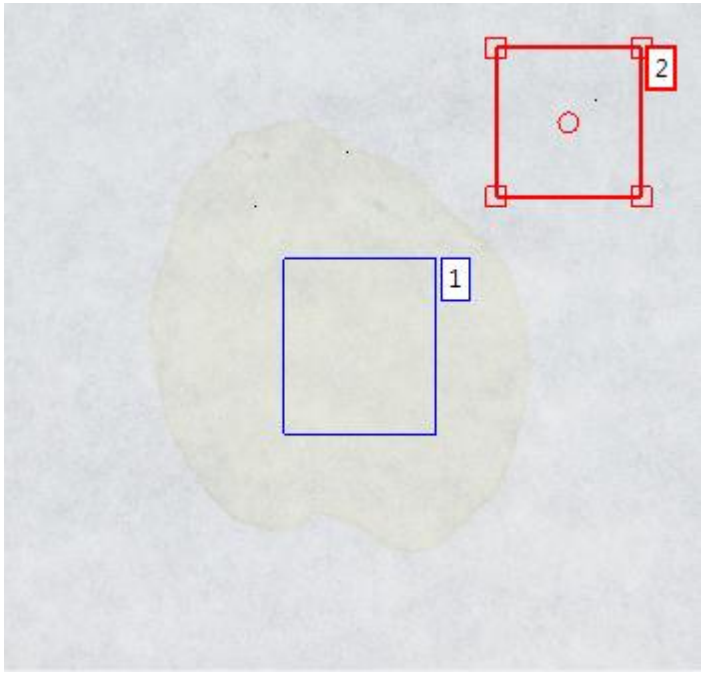


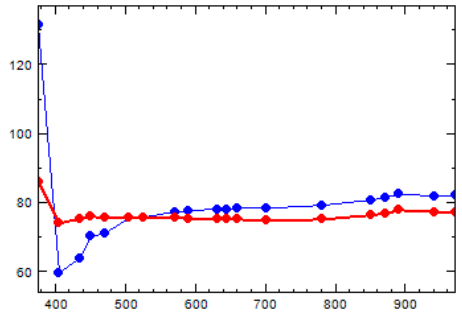
Spectrum

Saliva: red curve
Paper: green curve

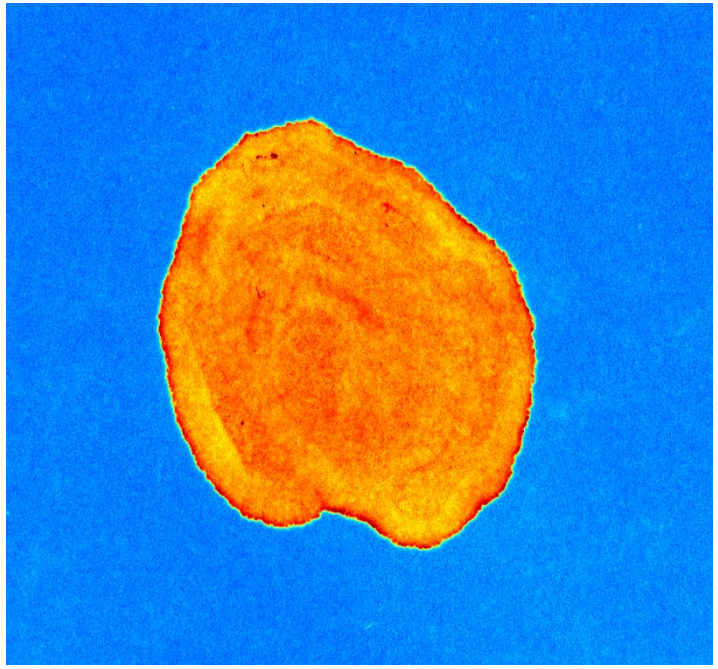
Semen on paper

Semen on paper





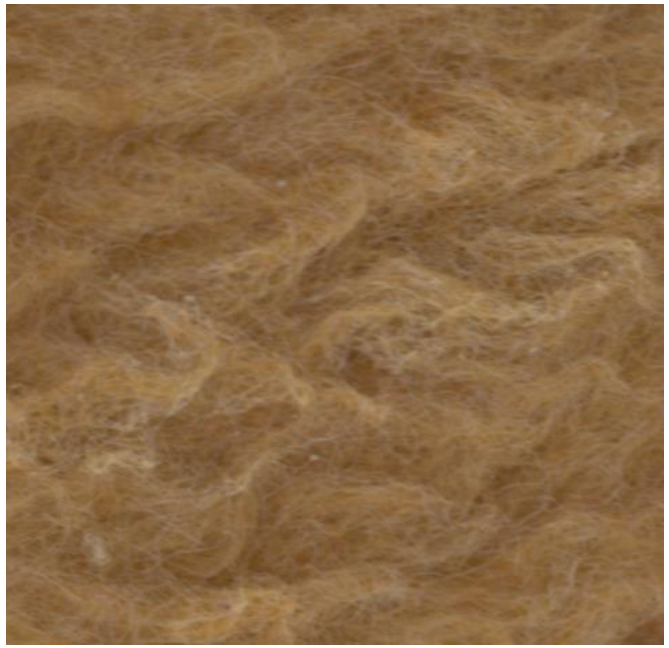
Semen detector



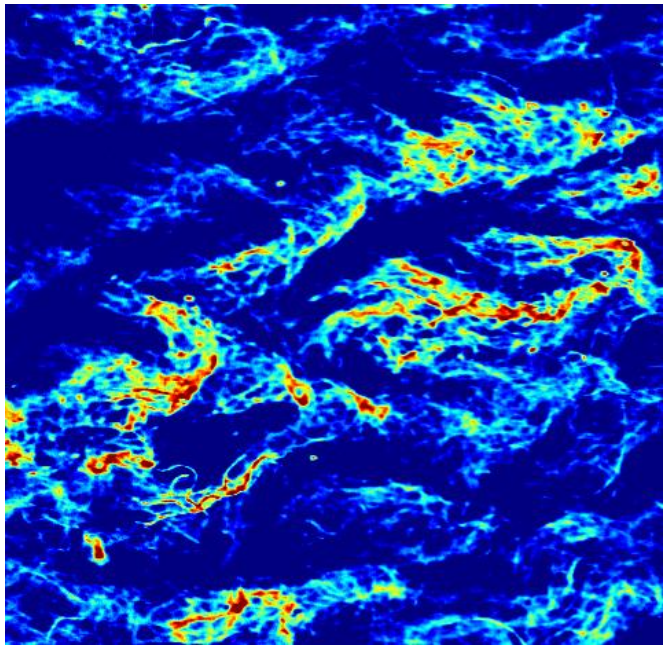
Semen: blue curve
Paper: red curve

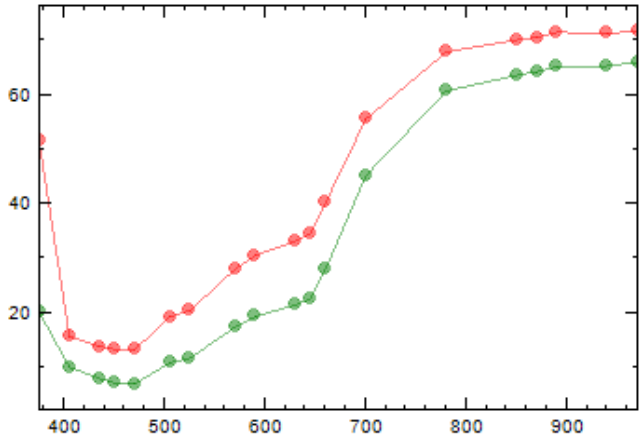
Semen on carpet

Semen on carpet



Semen detector

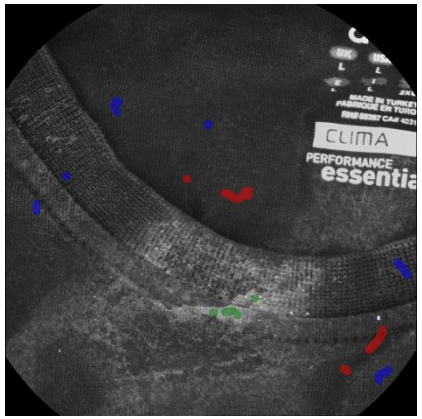




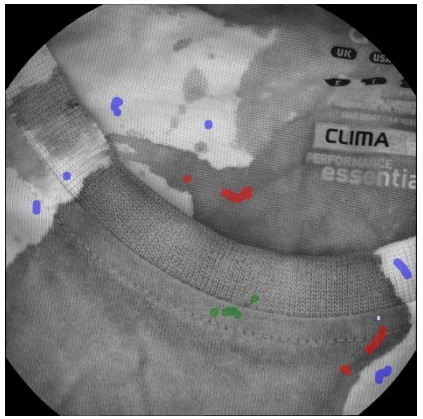
Semen: red curve
Carpet: green curve

Fabric with blood and semen

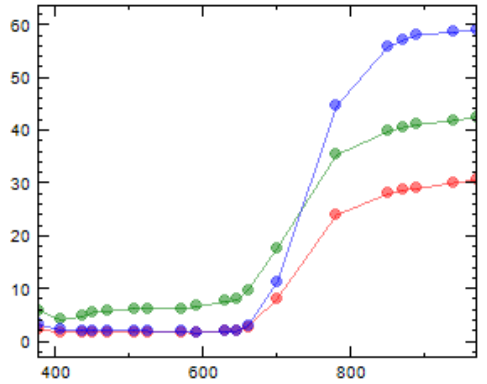
sRGB



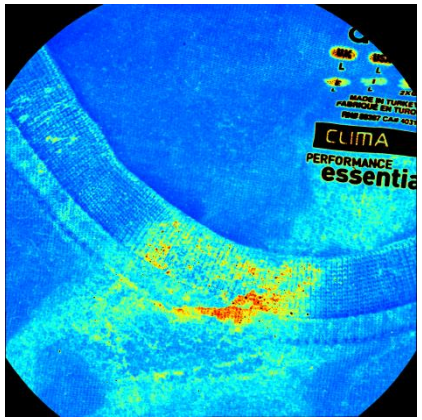
525 nm



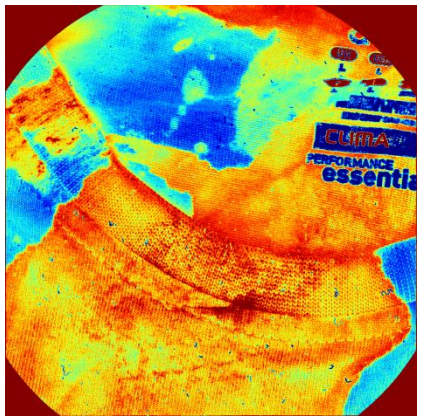
870 nm



Spectra of blood, semen, and fabric

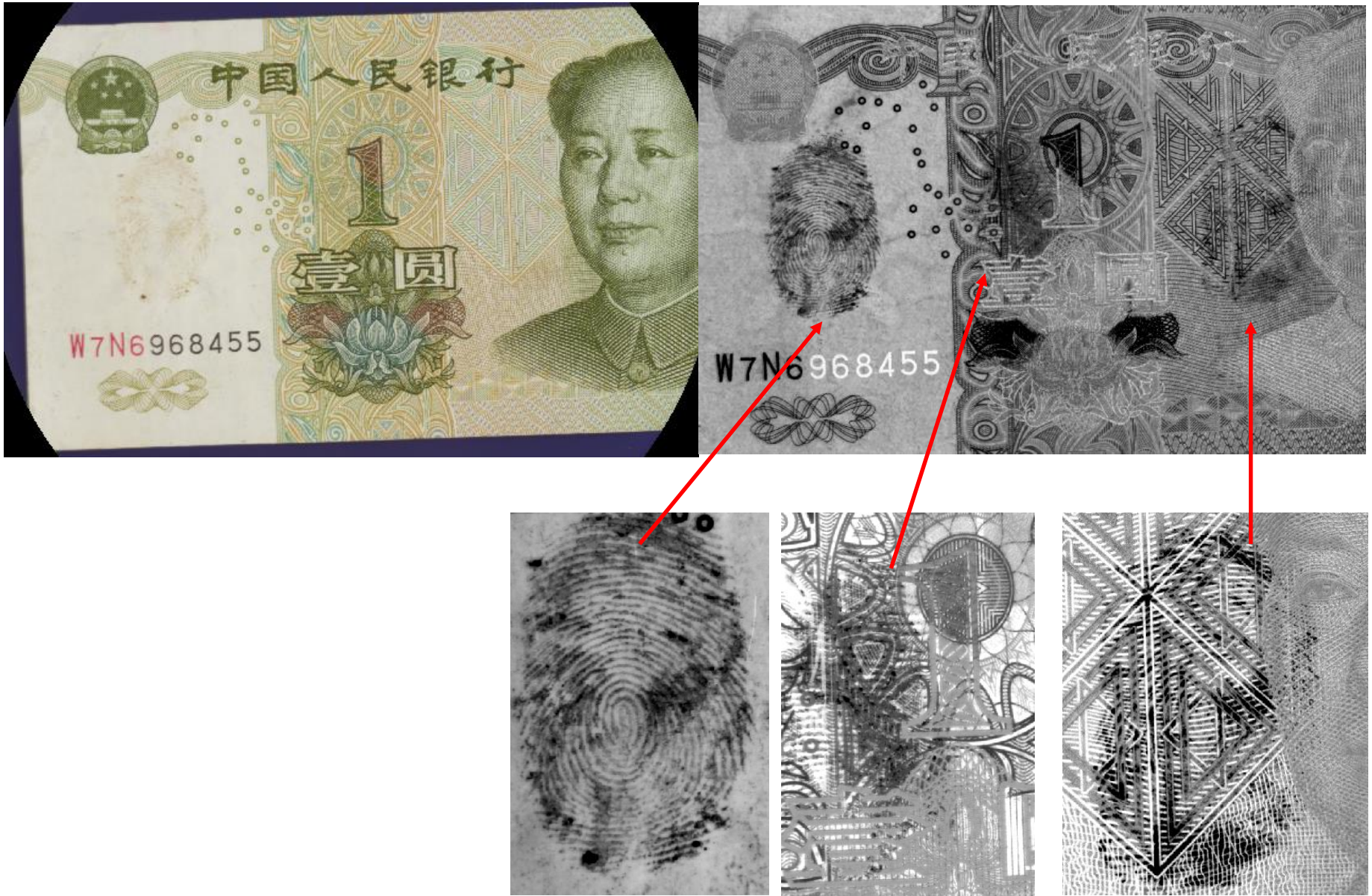


Semen detector

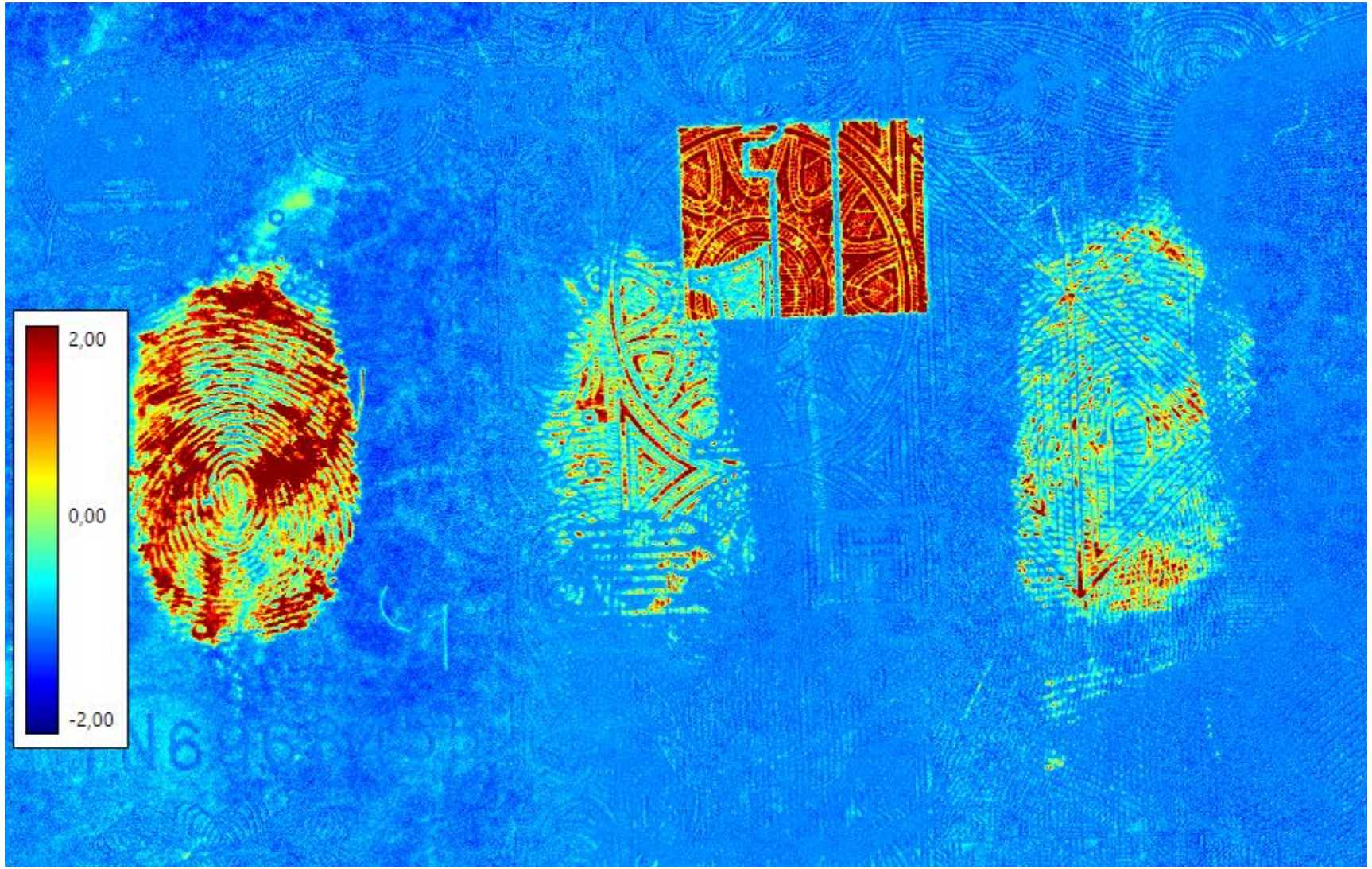


Blood detector

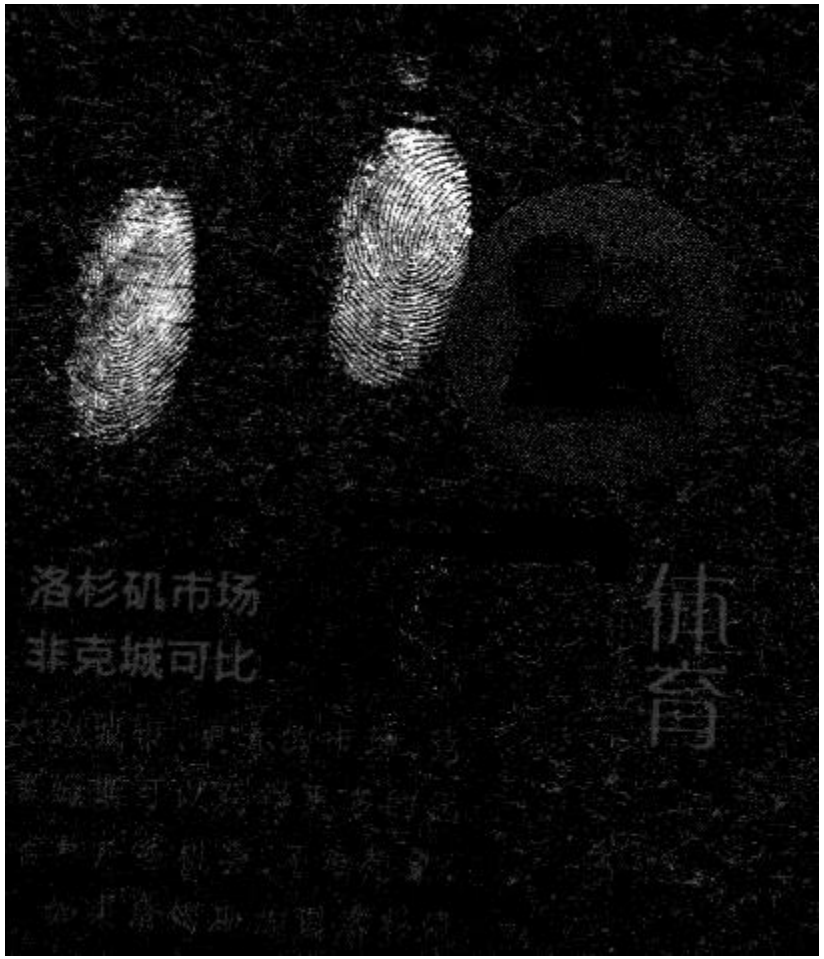
Blood fingerprint on 1 yuan



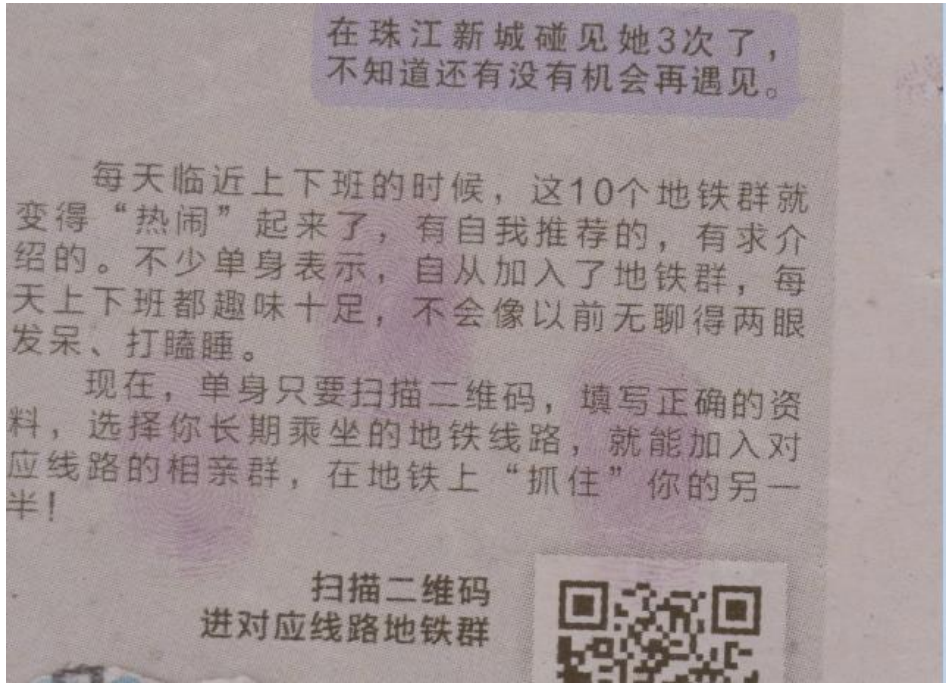
Supervised fingerprint detection



Blood fingerprint on newspaper

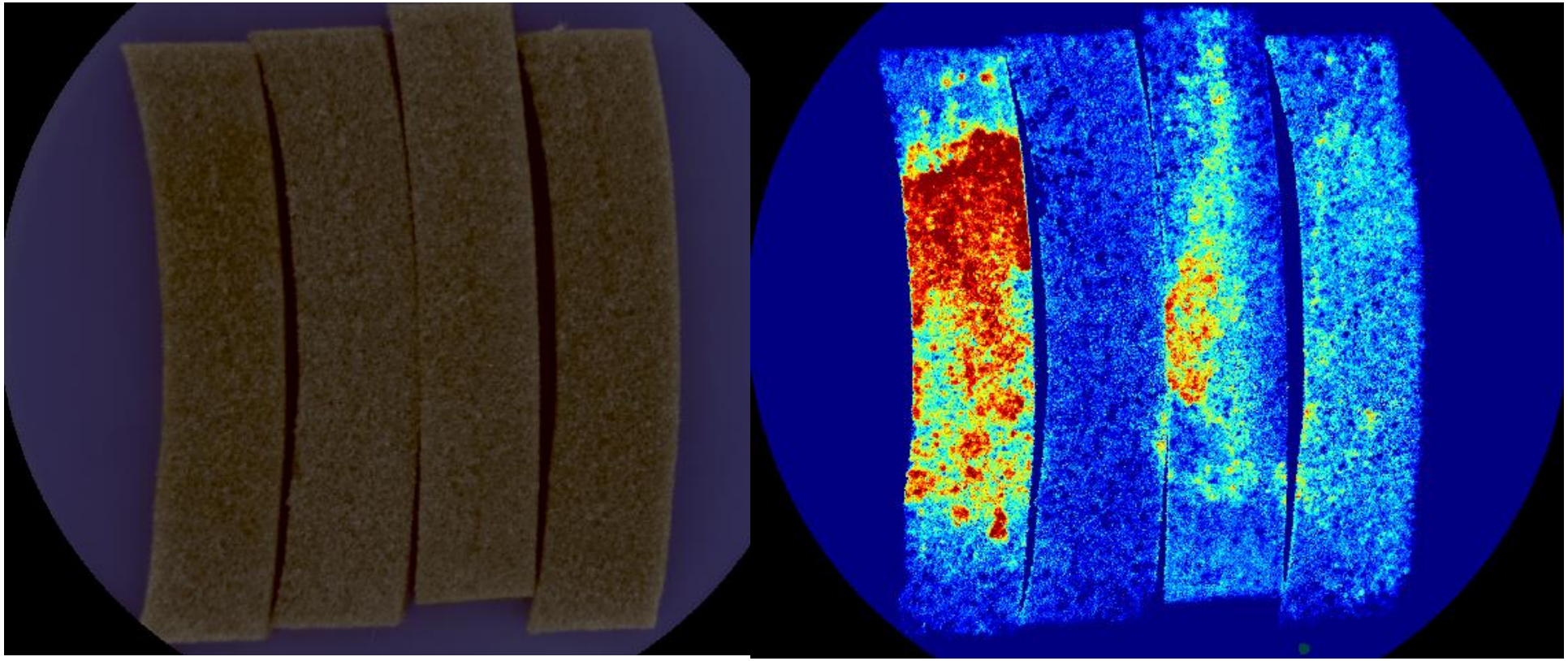


Ninhydrin fingerprint on paper



Ninhydrin fingerprint with minimal influence from other print on the paper

Blood on sponges 1:5 1:10 1:20 1:40



Presumably wrong side of 1:10 imaged by the camera

Blood on cotton 1:5 1:40

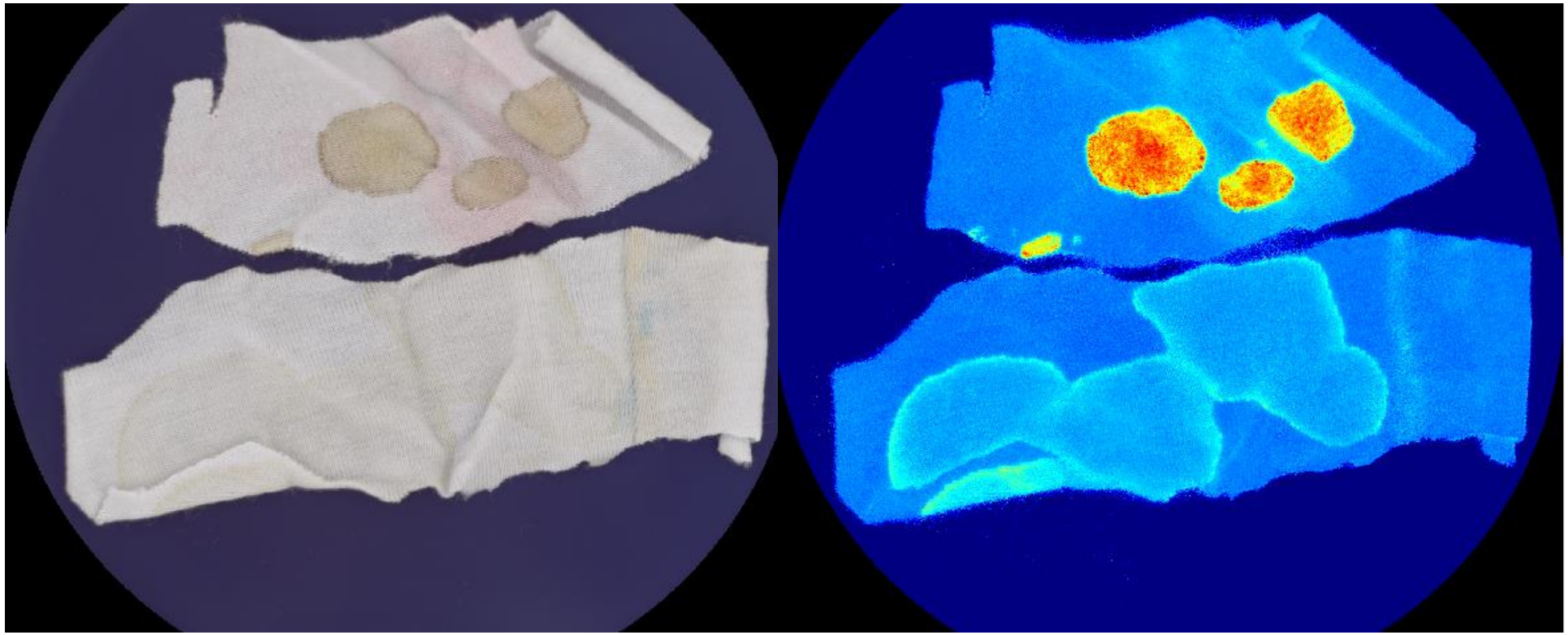
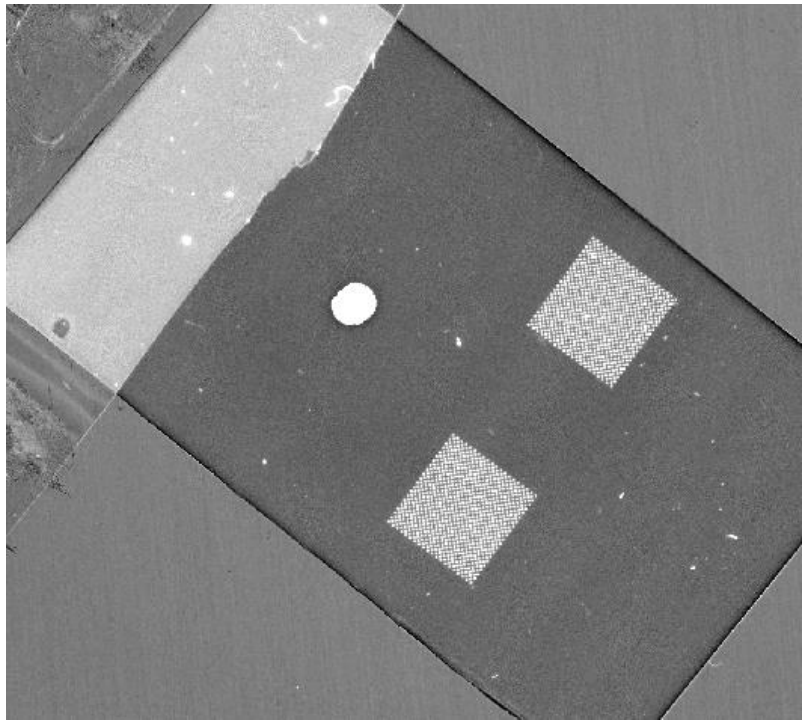


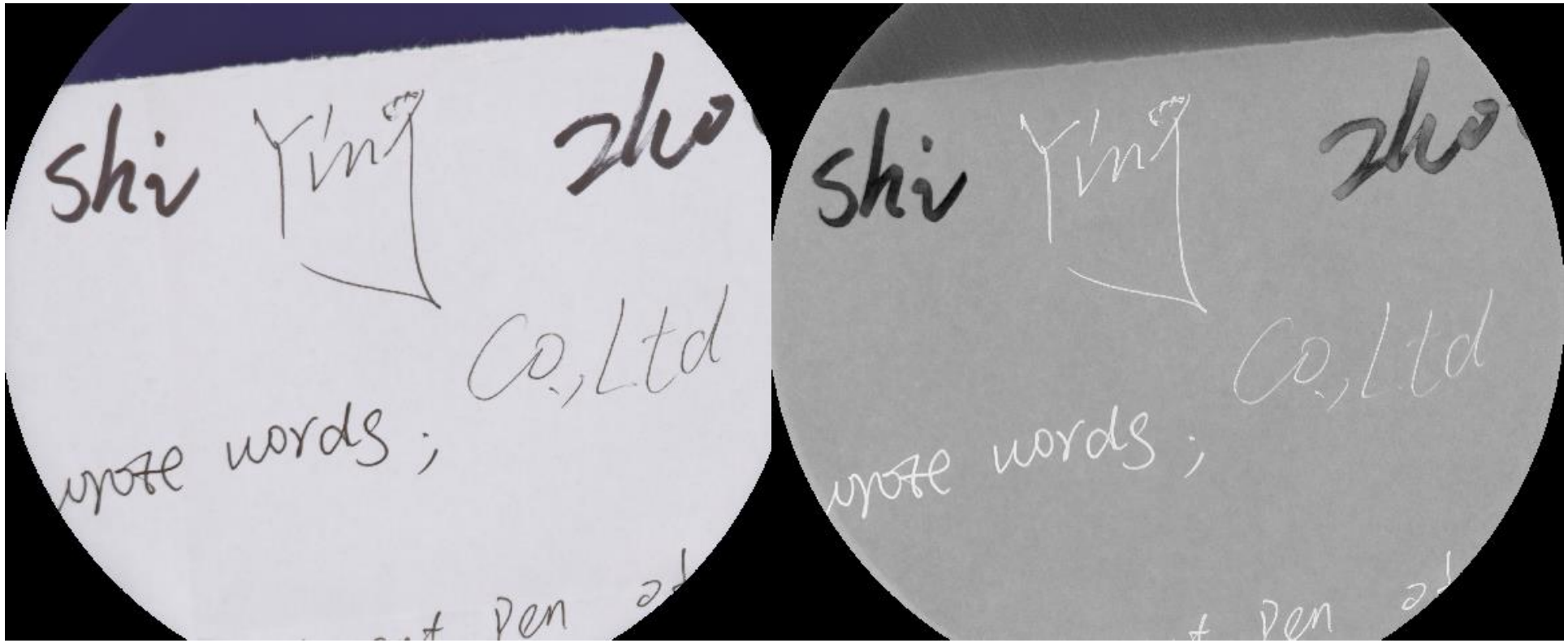
Plate with blood stain and matrix

sRGB image

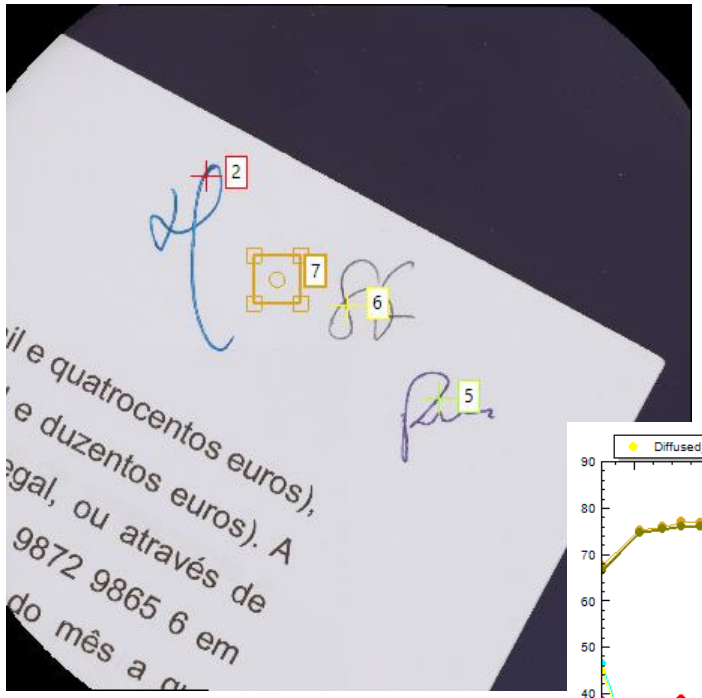


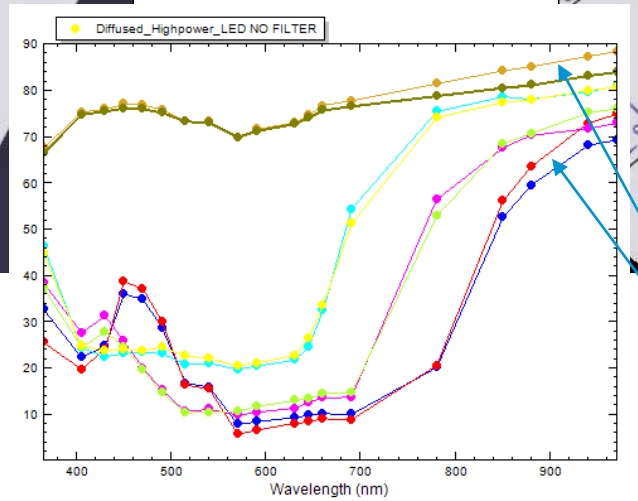
MNF2 score image
after blind extraction

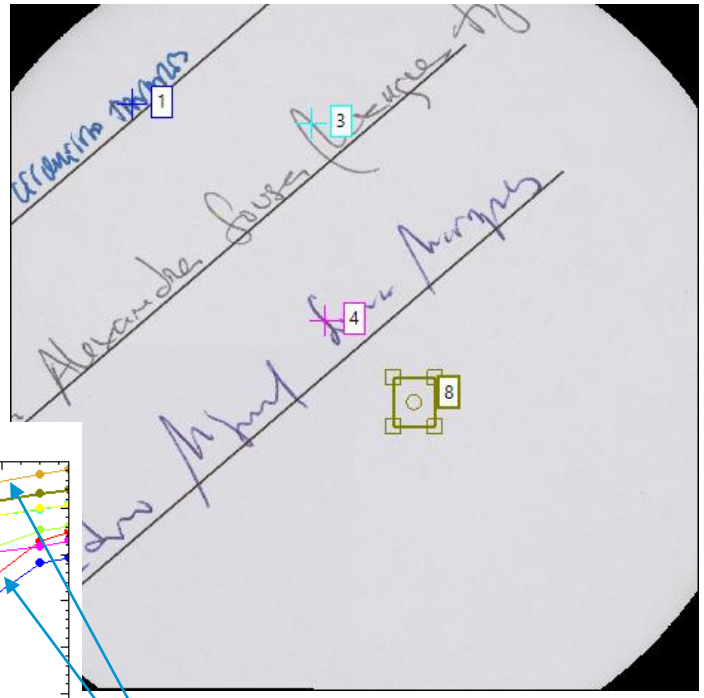
Ink traces



Initials page and signature page

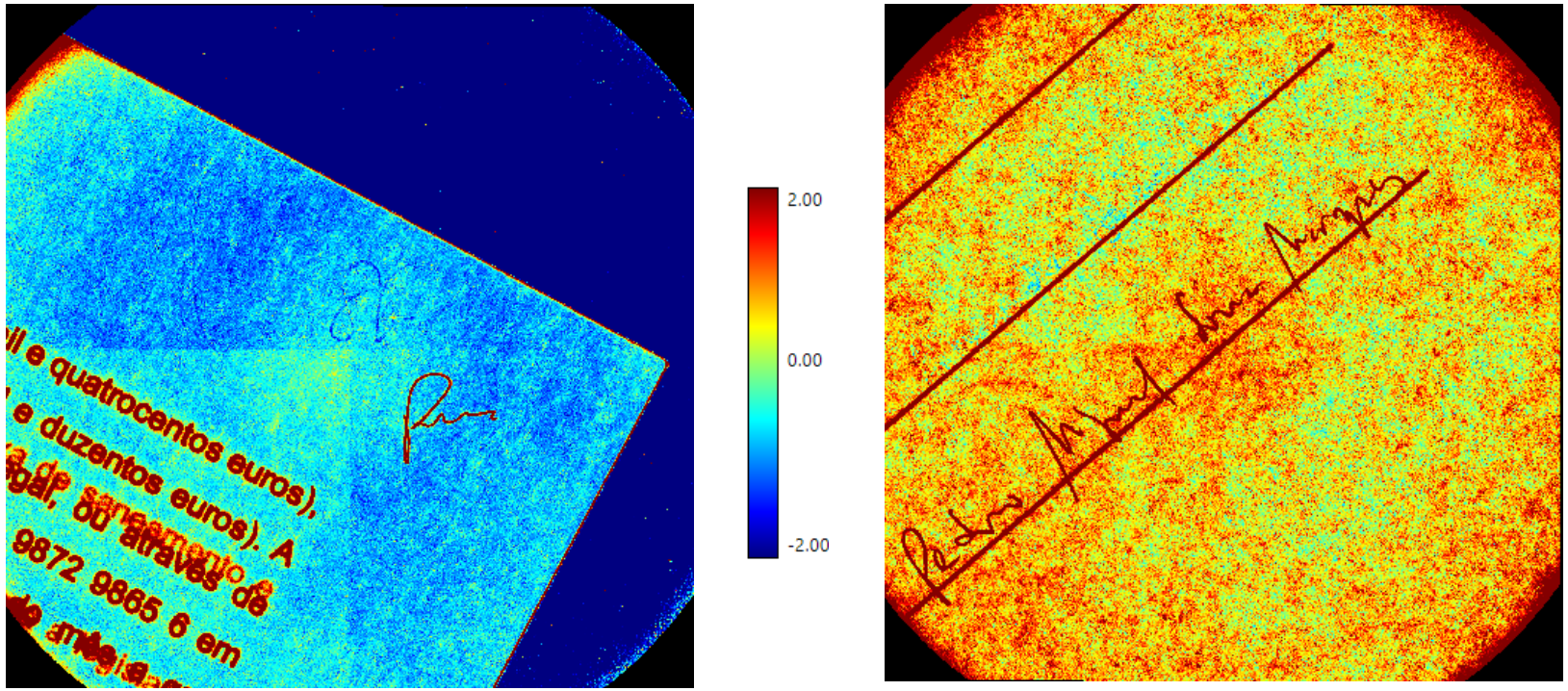






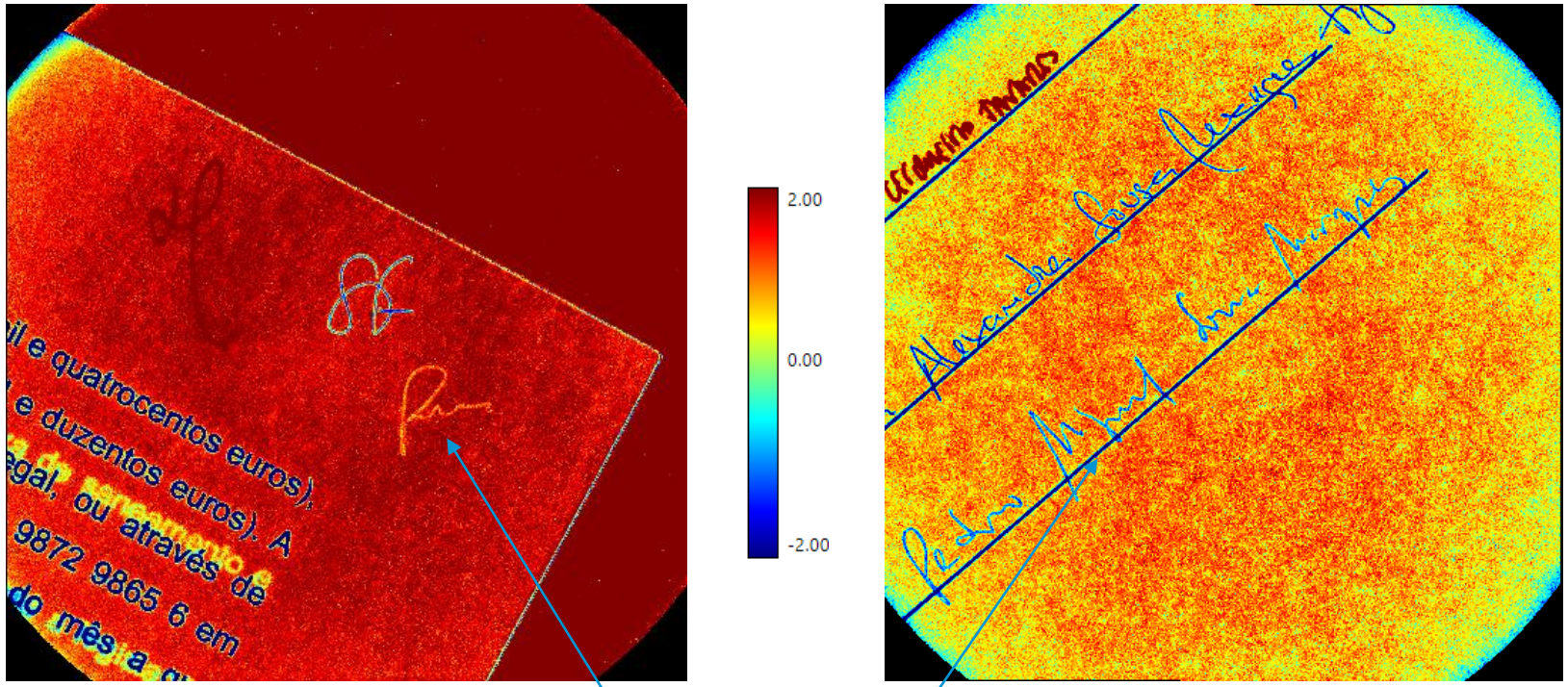
NIR gap caused by paper difference

nCDA separating the black initial and signature



Maximum difference between ink spectra is actually caused by the paper.

nCDA separating the last blue initial and signature

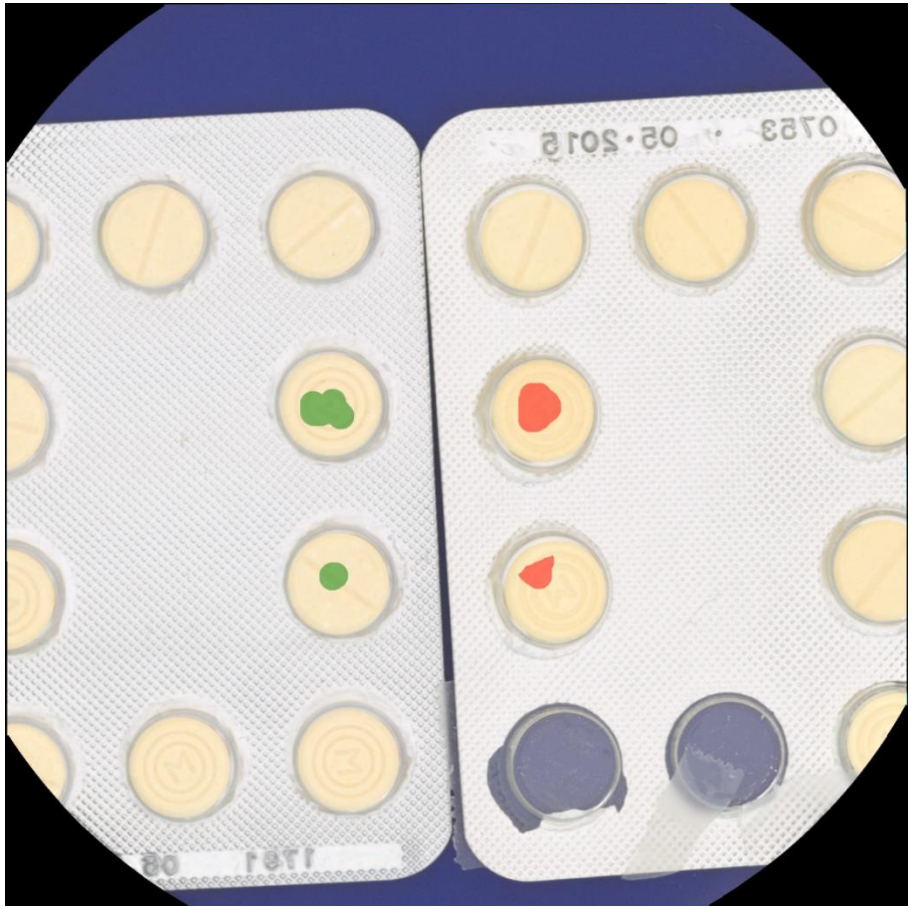


Maximum difference between blue ink spectra is caused by the paper and ink spectra.

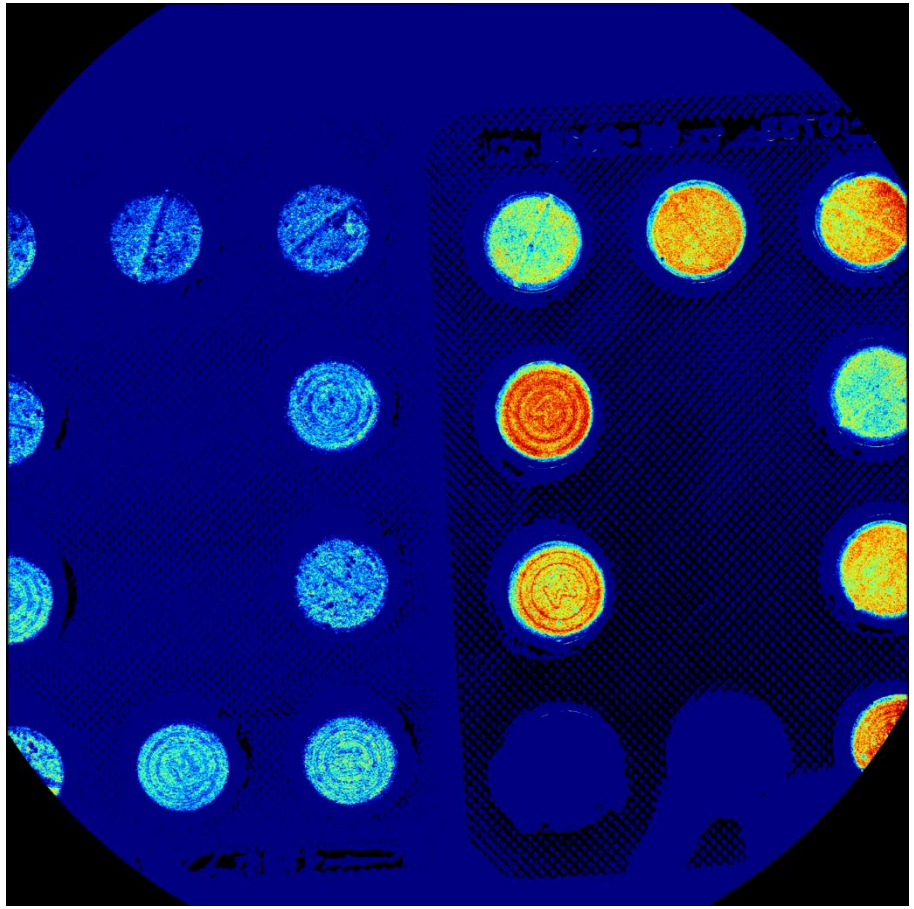
100 dollar note

sRGB and 5 MNFs

Genuine and counterfeit tablets



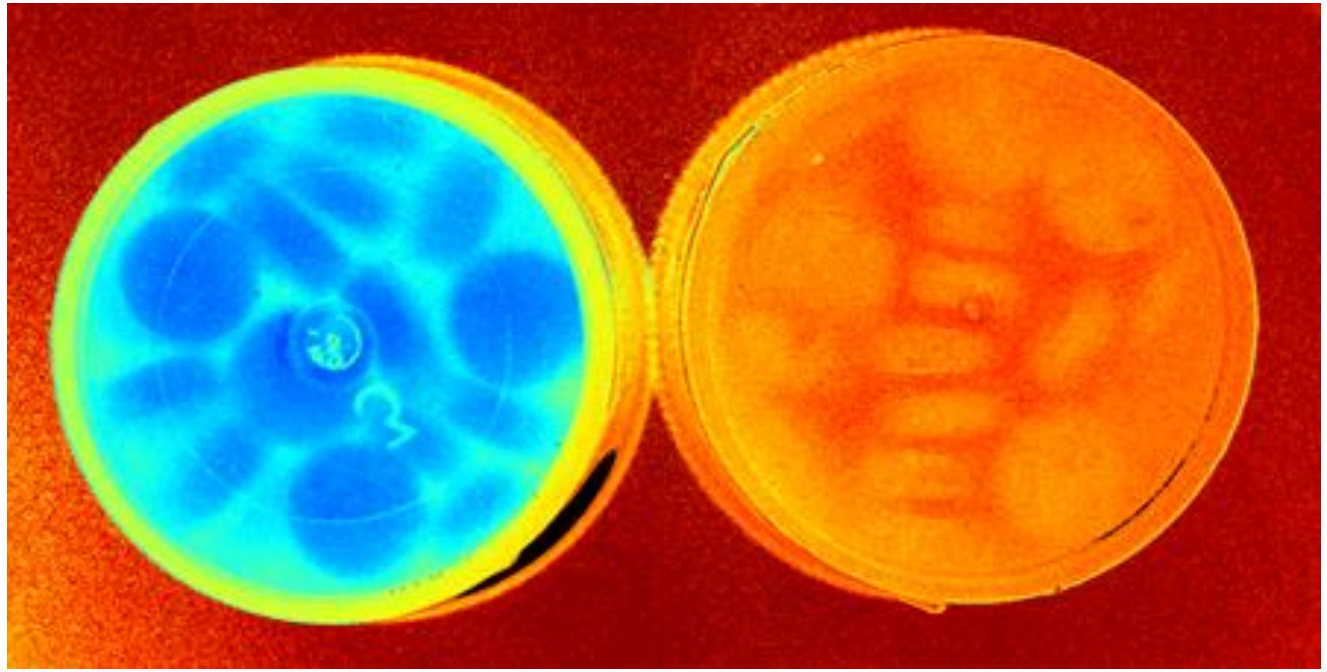
Two tablet in the genuine package (left) has been marked with green layer



The spectral fingerprint of counterfeit tablets is significantly different from the genuine tablets. Further there seem to be a much larger variation among counterfeit tablets

Tablets in plastic bottle

Genuine left, Counterfeit right



Counterfeit tablets can be detected through the bottle

Latent fingerprint on mobile phone