



LED μ SF[®]

Portable Spectrofluorimeter

for non-invasive analysis of cultural heritage artworks using LED sources

Ancient paintings (murals, manuscripts, polychromy, engravings, easel paintings) | Dyestuff | Binders

Other applications

Food quality check | Chemical/Polymer identification | Biomolecule analysis and more

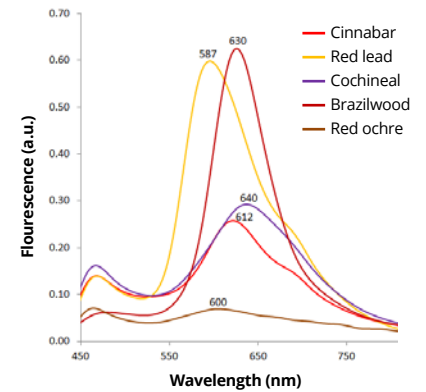


Features of LED μ SF

- + Portable and lightweight spectrofluorimeter
- + Contactless, non-invasive and non-destructive measurements
- + Modular design: exchangeable LEDs from 255 ... 623 nm according to the materials analyzed
- + Irradiation spot: ca. 1 mm
- + Adjustable power of LED
- + Remote triggering with the possibility to set integration time (adjustable from 3 μ s ... 600 s)
- + Database of reference spectra of pigments and binders
- + White LED for reflectance spectra
- + Camera and two red lasers for easy positioning and adjustment of the working distance (ca. 4 cm)
- + Recordable spectra from 190 ... 1100 nm with a resolution of 1.5 nm
- + Possibility to record background and white reference for the correction of reflectance measurements

UV fluorescence analysis of organic and inorganic materials:

- › Natural binders
- › Wax
- › Resin
- › Varnish
- › Pigments
- › Textiles
- › Dyes
- › Polymer materials



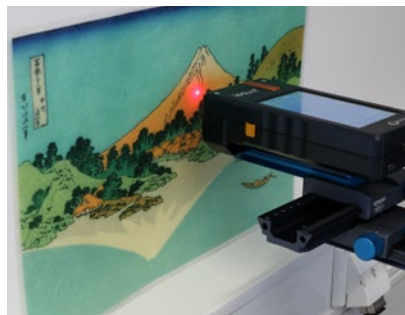
Fluorescence emission of five different red pigments

Scientific analysis of the materials in artwork answers various questions:

- › Characterization of pictorial techniques and pigments
- › Restoration assistance
- › Diagnosis of the state of conservation
- › Authentication of mural



Tripod with Z positioning



Targeting using 2 laser pointers



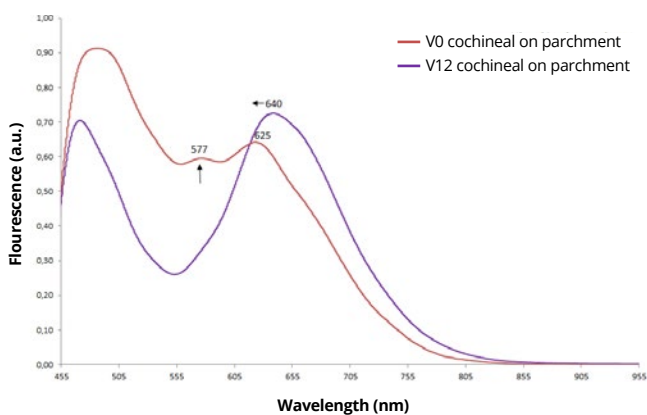
Easy operation from touch screen



Exchangeable LEDs

Monitoring of an accelerated ageing

Legend: Before irradiation, the cochineal has a maximum of fluorescence emission at about 640 nm (due to anthraquinones compounds: carminic acid & laccaic acid). After 12 hours of UV light irradiation at 254 nm, the maximum of emission shifts towards the short wavelengths (625 nm) and the band of the yellow components is more visible at 577 nm which indicates the destruction of the red carminic acid.



Ageing of cochineal

Last revision: 4th June, 2018

LED μ SF includes,

- › Measurement head
- › LED source
- › Control electronics
- › Optical and opto-mechanical positioning elements,
 - › An X/Y adjustment plate
 - › A tripod with Z positioning
 - › USB cables
- › Software for post measurement processing (example: Kubelka Munk treatment)

Publications

Mounier A., Le Bourdon G., Aupetit C., Lazare S., Perez-Arante-gui J., Almazan D., Aramendia J., Prieto-Taboada N., Fdez-Ortiz de Vallejuelo S., Daniel F., 2018, Red and blue colours on 18th-19th century Japanese woodblock prints: In situ analyses by spectrofluorimetry and complementary noninvasive spectroscopic methods, *MicroChemical Journal* 140, pp129-141. DOI:10.1016/j.microc.2018.04.023.

Mounier A., Lazare S., Daniel F., 2016, LED μ SF: A new portable LED μ SF device for fragile artworks analyses. Applications on medieval pigments, *Technart* 2015, 27-30 avril 2015, Catane, *MicroChemical Journal*, DOI 10.1016/j.microc.2016.01.008.

Technical specifications

LED sources	up to 15 different wavelengths (255 623 nm) are available
Power requirements	24 V power supply or power bank
Dimensions	170 x 80 x 53 mm
Weight	ca. 0.8 kg
Certification	manufactured under ISO 9001 guidelines, CE conform



Headquarters

Freiberg Instruments GmbH

Delfter Str. 6
09599 Freiberg
Germany

t +49 3731 419 54 0
sales@freiberginstruments.com
www.lexsyg.com

