

PLASAR - equipment

Plasma and Laser Applied Research

Contact angle, optical microscope, analytical micro-balance



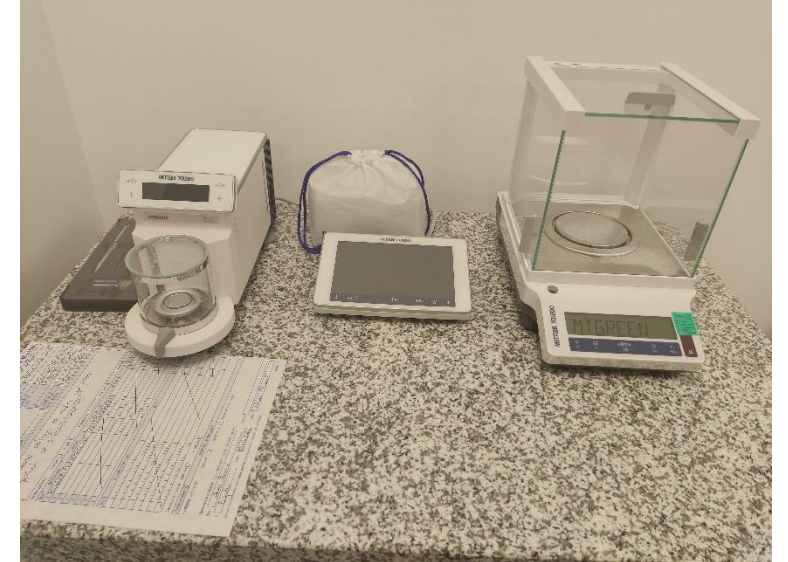
Dataphysics OCA15EC

Device for measuring contact angle (wettability) of the material
The possibility of determining static and dynamic contact angle and surface free energy (or surface tension)
Drop shape analysis
Digital dosing



Leica DM2700M

Optical microscope, magnifications 5x, 10x, 20x, 50x, 100x x okular 10x
- Digital camera



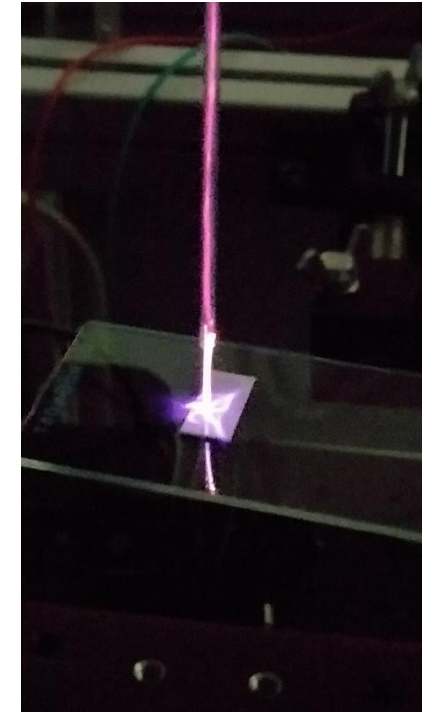
Mettler Toledo XPR6UD5

Ultra microbalance with a weight step of 0.5 μg
Maximum weighing mass 6.1 g

Atmosferski plazmeni mlaz (za tretman materijala)



HV source: 230 V AC -> 4-25 kV DC
HV pulses shape generator
Ar, He, ... Plasma jets
Treatment of materials
Impel



Water purifier, ultrasonicator i centrifuge

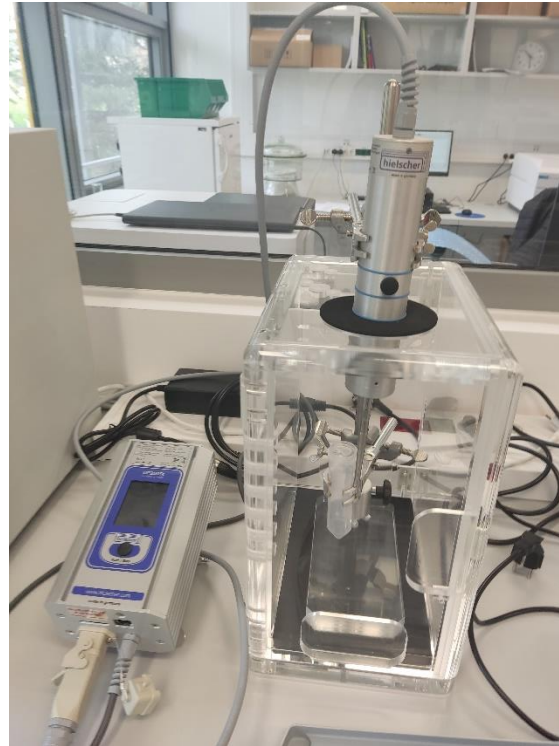


Lauda Puridest PD 2 DG

Double distilled water
Directly from tap water
2 L/h

Conductivity mono
distillate at 25 °C 2.2 $\mu\text{S}/\text{cm}$

Conductivity bi
distillate at 25 °C 1.6 $\mu\text{S}/\text{cm}$



Hielscher UP200St-T Ultrasonic Transducer

Power 200 W
Different tips



Laboratory Centrifuge MPW-M diagnostic

6000 / 4000 rpm
4 compartment
Tubes 100 mL (viale)

Nanosizer // Zeta sizer // UV-Vis-NIR with integrating sphere

Malvern NanoSight NS300



Size distribution of nanoparticles
(10 – 1000 nm)
Concentration of nanoparticles
(10^6 – 10^9 NP/mL)

Malvern Zeta Sizer Ultra



Size distribution of nanoparticles
(0.3 nm – 10 μ m)
Z-potential of nanoparticles

Agilent Cary 5000

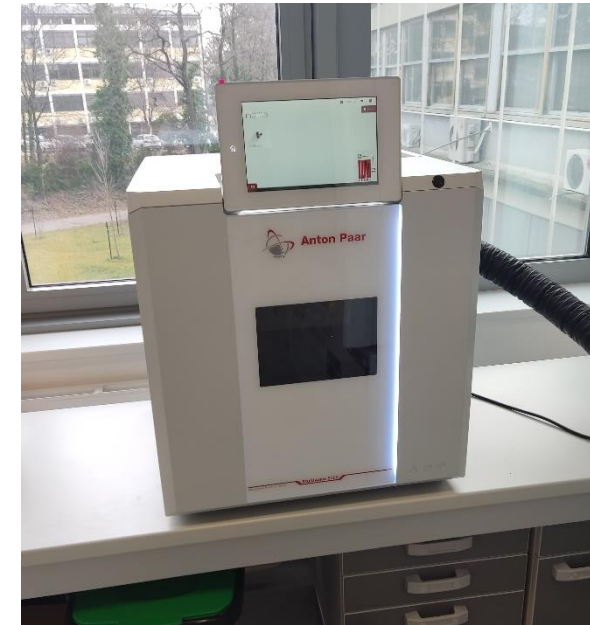


Spectral range 175 – 3300 nm
Dinamical range 8 Abs
Integrating sphere for precise measurements
(diffuse R i T)

ICP-OES spectrometer



Simultaneous multielemental analysis of materials
Broad dynamical range from **ppb** to %
Consumption: Ar 50L/200bar / 8 hours of operation
Autosampler (60 + 8 vial)
Shimadzu ICPE 9820



Microwave digestion – sample preparation for ICP-OES
Anton Paar MultiWave 5000

FT-IR and photoluminescence spectrometer



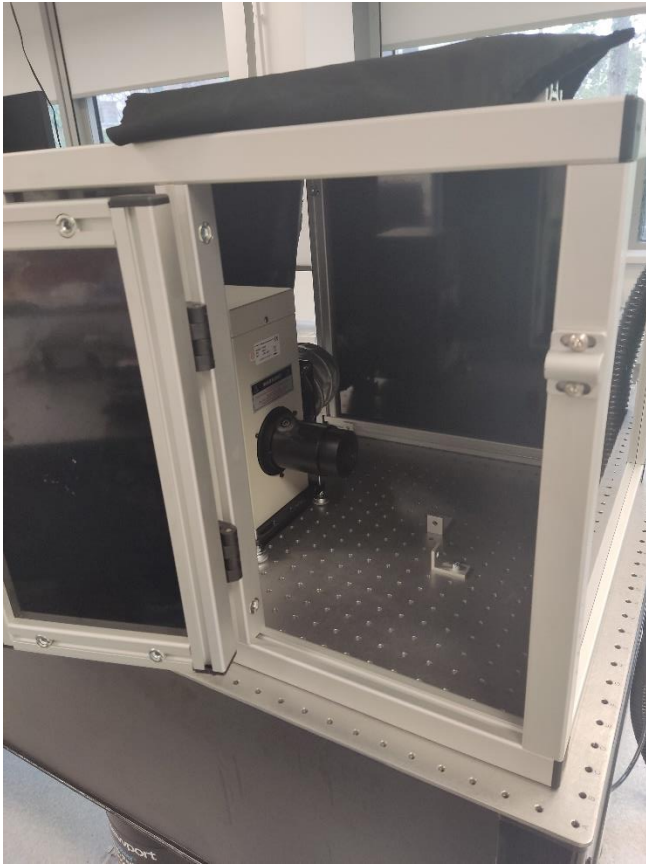
Spektrofluorometer **Shimadzu RF 6000**

- Xe lamp 150 W
- Variable excitation wavelength
- 3D spectra

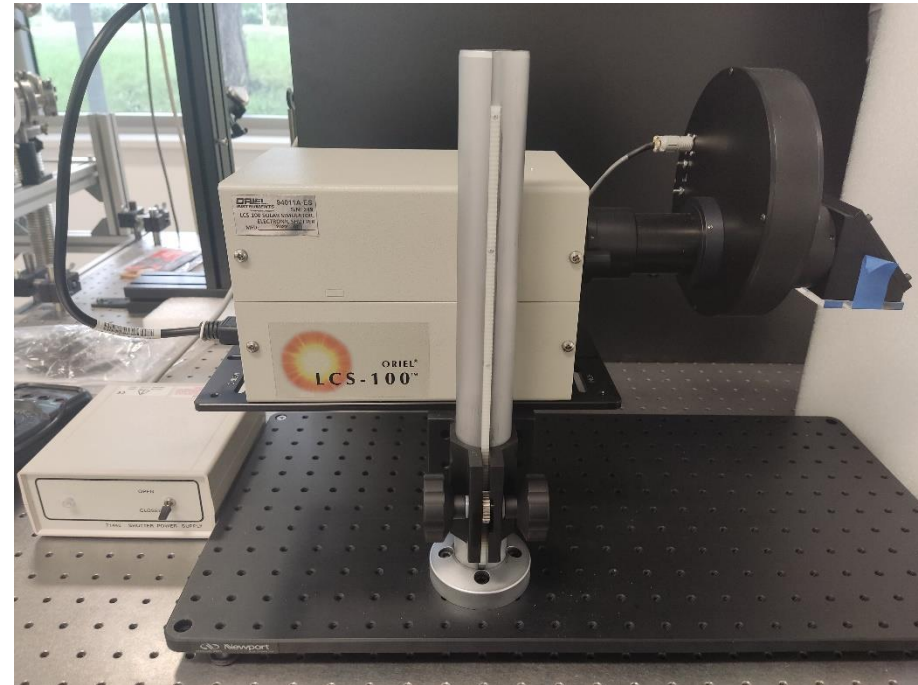
FT-IR **Shimadzu IR Spirit**

- Attenuated total reflectance
- Transmission
- 350-7800 cm^{-1}
- Čelija za tekuće uzorke

Lamps for photocatalysis



Mercury Light Source, 500 W Ozone Free
Ozone eater
Newport UVFS 500



Solar simulator
- 100 W Xe lamp
- certified to generate 1 SUN irradiance with an AM1.5G filter
Newport LCS 100

OES / LIBS spectrometers

High resolution spectrometer for laser plasma analysis



LTB DEMON

Echelle spectrometer with pre-monochromator and active wavelength stabilization

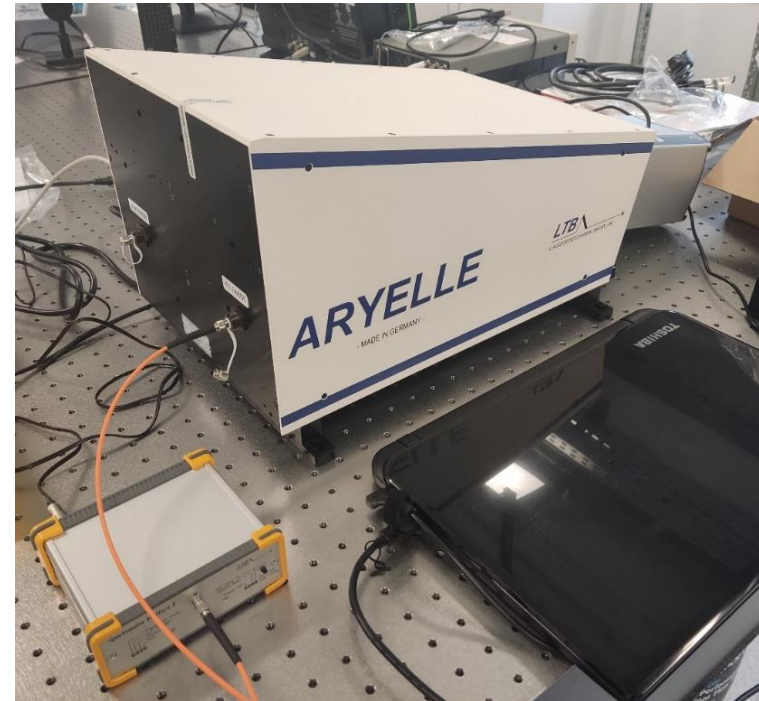
Wavelength range 193-900 nm

Spectral resolution 2.7 pm @ 200 nm, 10.7 pm @ 800 nm

iCCD camera, gate width 5 ns (**Andor iStar**)

16 bit A/D converter

Optical broadband emission spectrometers



LTB Aryelle Butterfly

Wavelength range 192.3-750 nm

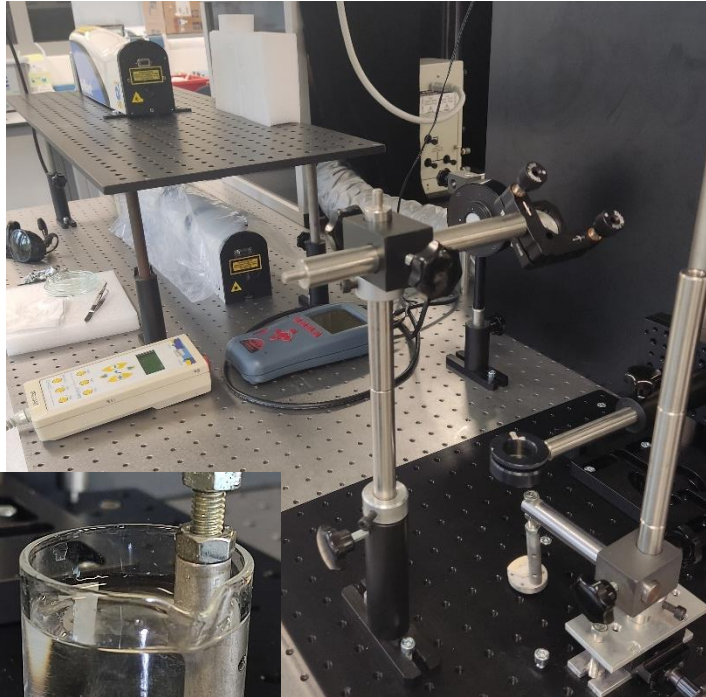
Spectral resolution 13 - 37 pm

iCCD camera, gate width 5 ns (**Andor iStar**)

16 bit A/D converter

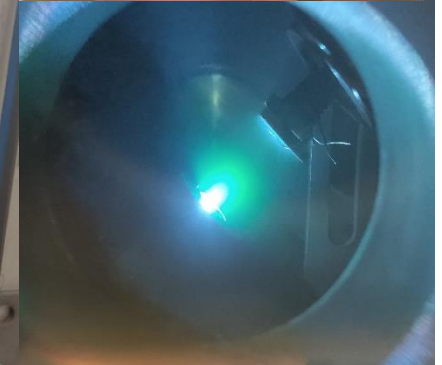
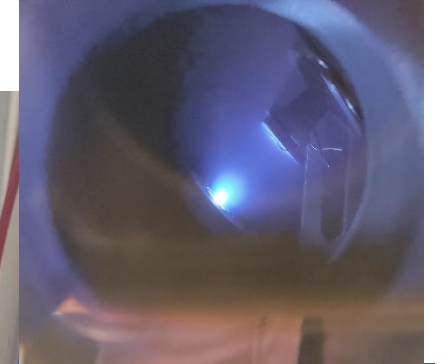
LAL i PLD sustavi

Laser synthesis of nanoparticles in liquids



Nd:YAG laser
(**Quantel Brilliant**)
300 mJ, 1-20 Hz,
1064 nm
(2w, 3w i 4w)

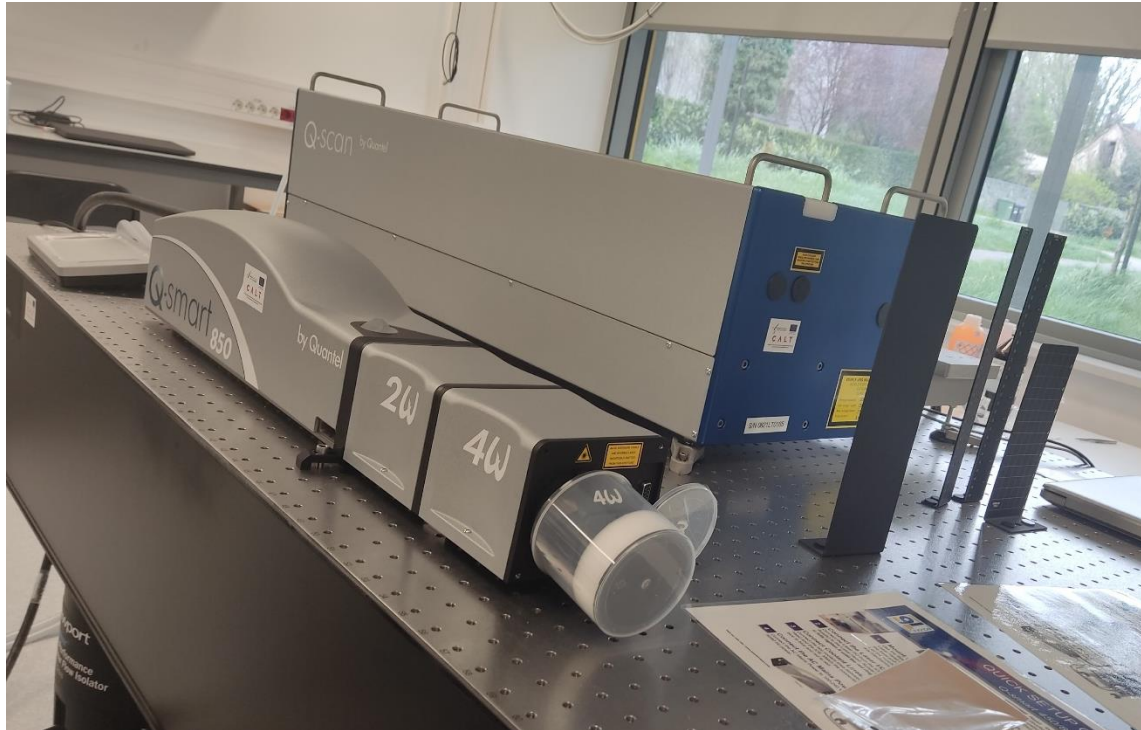
Pulsed laser deposition(PLD) of thin films



It will be improved with
new laser and
new chamber

- Substrate heater
- Turbo pump

Lasers – CRDS and laser plasmas



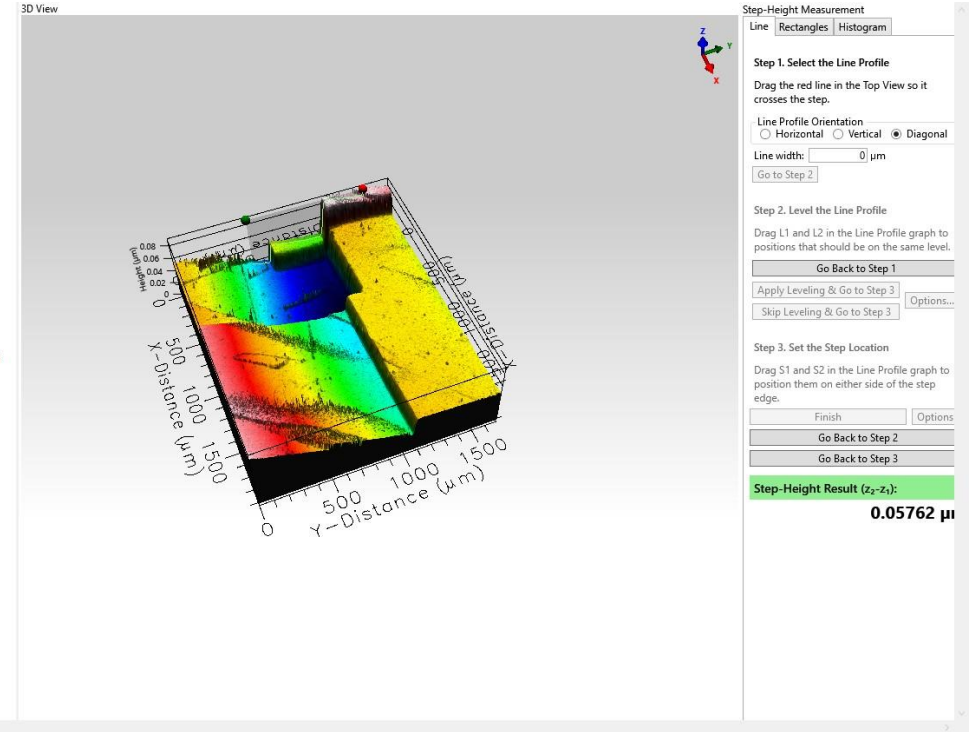
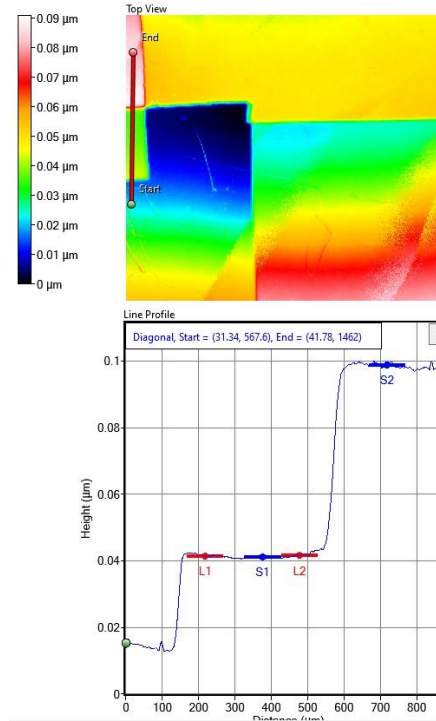
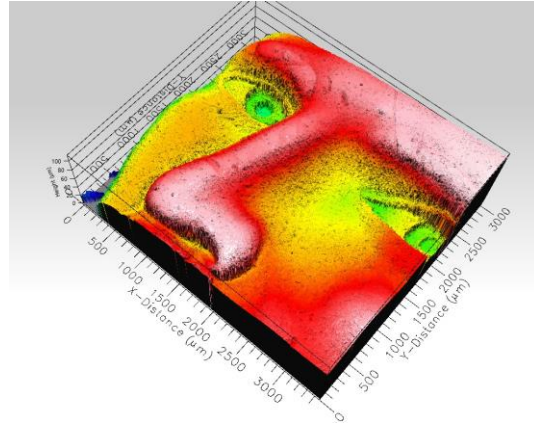
Q Smart i Q Scan Quantel

- Q Smart: 850 mJ, 1-20 Hz, 2w, 3w, 4w
- Laser plasmas, colloids, PLD

- Q Scan:
- Cavity ring-down spectroscopy
- CRDS for plasma and gas analysis (EUROfusion)



Profilometer: *Filmetrics Profilm 3D*



Performance Specifications

	WLI	PSI
Thickness Range	50 nm - 10 mm	0 - 3 µm
RMS Repeatability ¹	1.0 nm	0.1 nm
Step Height Accuracy ²	0.7%	
Step Height Repeatability ³	0.1%	
Sample Reflectance Range	0.05% - 100%	
ISO 25178 Compliant	Yes	

- ¹ Typical value
- ² 8 µm step, 1 sigma
- ³ 8 µm step, 100 successive measurements, 1 sigma

Objectives Specifications

Objectives ¹ (Nikon CF IC Epi Plan)

Magnification	2.5X	5X	10X	20X	50X	100X
Field of View at 1X Zoom	8.0 x 6.8 mm	4.0 x 3.4 mm	2.0 x 1.7 mm	1.0 x 0.85 mm	0.4 x 0.34 mm	0.2 x 0.17 mm
Numeric Aperture	0.075	0.13	0.3	0.4	0.55	0.7
Working Distance	10.3 mm	9.3 mm	7.4 mm	4.7 mm	3.4 mm	2.2 mm
Spatial Sampling at 4X Zoom ²	3.52 µm	1.76 µm	0.88 µm	0.44 µm	0.176 µm	0.088 µm
Resolving Power of Lens	3.7 µm	2.1 µm	0.92 µm	0.69 µm	0.5 µm	0.4 µm
Maximum Sample Slope ³	3°	8.5°	14°	21°	25°	42°

