

X-Ray & Thermal Analysis Unit

Unit Pengurusan Makmal Universiti
Blok T03 Bangunan UIRL
Universiti Teknologi Malaysia
81310 Skudai Johor

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Introduction

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Team Members



Laboratories



Laboratory : Advanced X-ray Photoelectron Spectroscopy Laboratory (Room no : 01-32-01)
Instrument : X-Ray Photoelectron Spectroscopy (XPS)



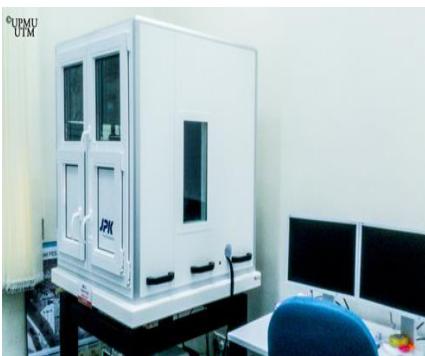
Laboratory : Advanced X-ray Spectroscopy Laboratory (Room no : 01-32-01)
Instrument : Small Angle X-Ray Scattering (SAXS)



Laboratory : Advanced X-ray Diffractometer Laboratory (01-33-01)
Instrument : X-Ray Diffraction (XRD)



Laboratory : Advanced Optical Microscope & Nano Raman Photoluminescence Laboratory ((01-34-01))
Instrument : Raman Xplora Plus (Raman-
AFM)



Laboratory : Advanced Optical Microscope & Nano Raman Photoluminescence Laboratory ((01-34-01))
Instrument : Atomic Force Microscopy (AFM)



Laboratory : Advanced Optical Microscope & Nano Raman Photoluminescence Laboratory ((01-34-01))
Instrument : Raman LabRAM HR Evolution (Raman)



Laboratory : Thermal Analysis Laboratory (T03-01-124)
Instrument : Thermogravimetry Analyzer Interface With FTIR (TGA-IR)



Laboratory : Thermal Analysis Laboratory (T03-01-124)
Instrument : Thermogravimetry Analyzer With DSC (TGA-DSC)

X-Ray Photoelectron Spektroscopy (XPS)



Brand : Shimadzu

Model : AXIS ULTRA DLD

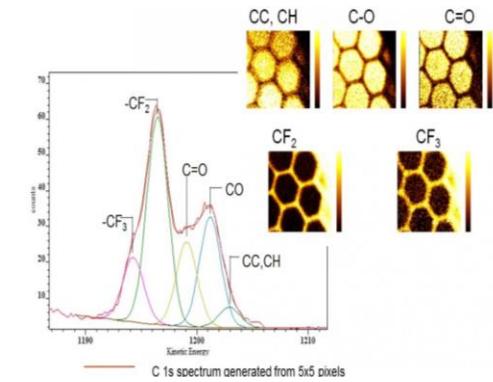
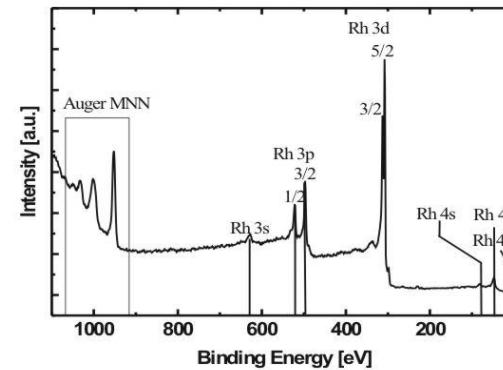
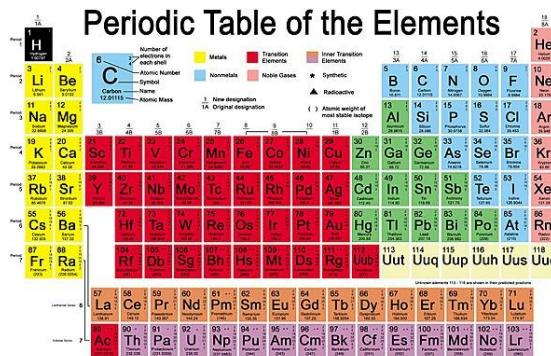
Location : Advanced X-ray Photoelectron Spectroscopy Laboratory

Person In Charge :

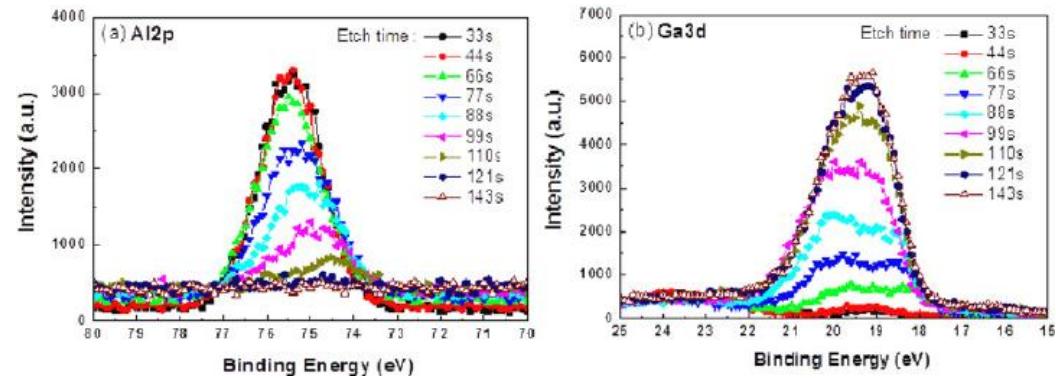
- Amy Zuria – amyzuria@utm.my
- Siti Zahara – szahara@utm.my



Function



- Chemical element detection
 - C 1s, O 1s, Cu 2p, N 1s
- Composition of chemical element
- Binding energy



Type of sample

- Non Organic
- Metal
- Semiconductor
- Polymer
- Ceramic



Sample size : Not more than 2cm x 2cm for solid. Thickness not more than 1cm.

Amount required : Small amount (about 5g only).

Rigaku Smartlab



Brand : Rigaku Smartlab
Model : Smartlab

Location : Advanced X-ray Diffraction Laboratory

Person In Charge :

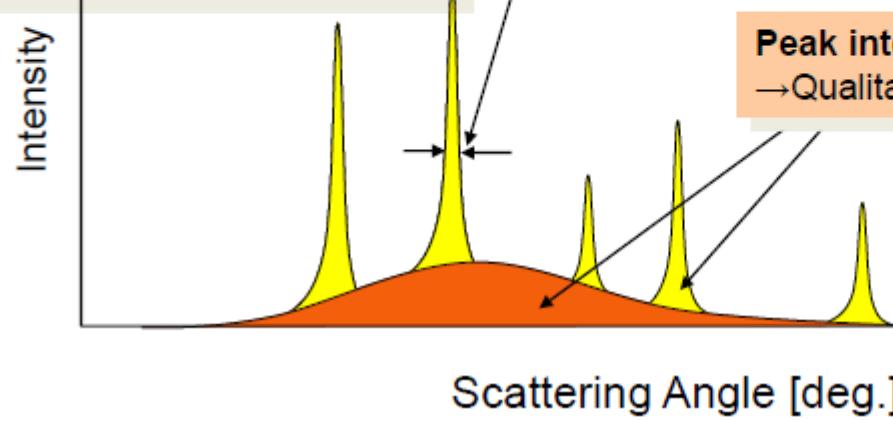
- Amy Zuria – amyzuria@utm.my
- Mohd Izzam – m.izzam@utm.my

Function

Peaks
→ verifying the existence of crystalline phase

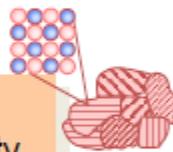
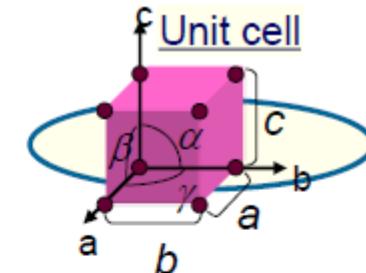
Peak position
 d values → Phase ID,
Lattice parameter
Shift → Transformation
(distortion) of the lattice

Peak width
→ Crystal quality
Crystallite size
Lattice distortion

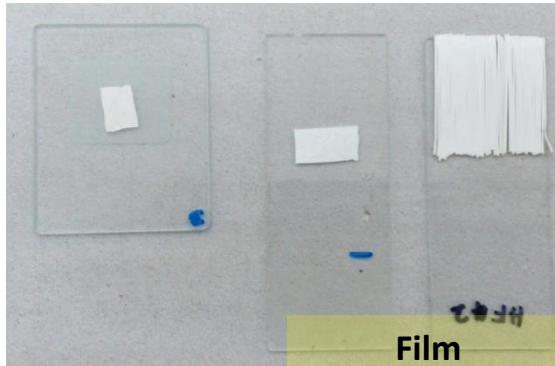
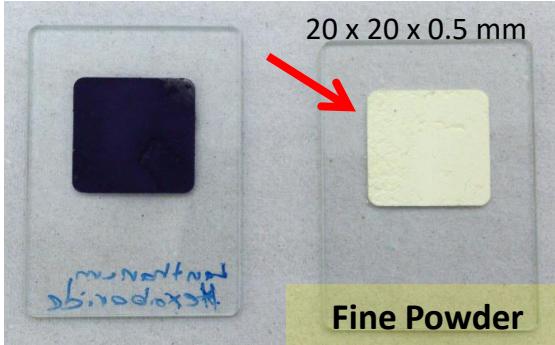


Peak intensity
→ Qualitative analysis, Crystallinity

Intensity vs. Orientation
Preferred orientation



Type of sample



Powder
Solid
Film

Thermogravimetry With Fourier Transform Infrared

©UPMU
UTM



Brand : TA Instrument

Model : Q500

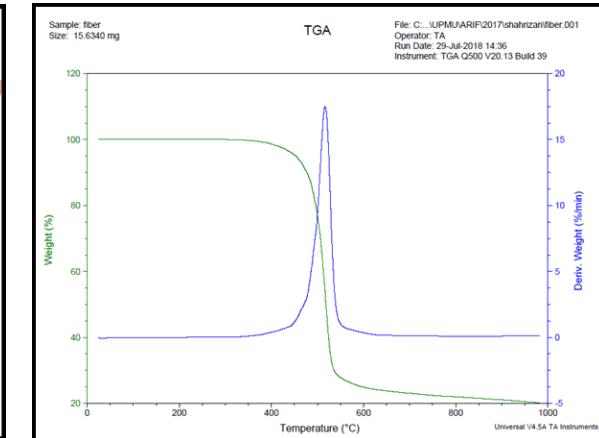
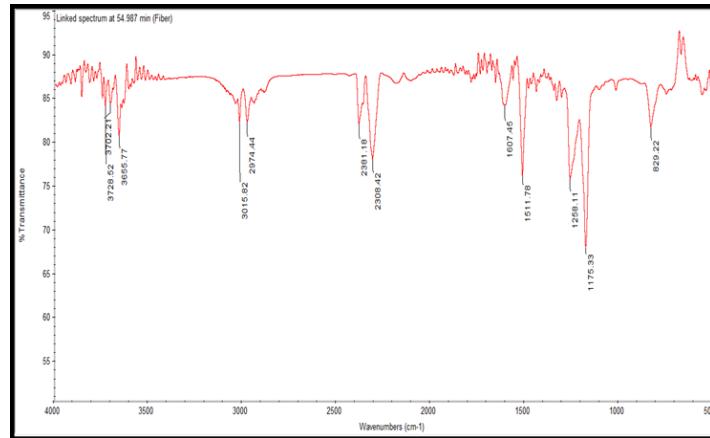
Location : Molecular Spectroscopy Laboratory

Person In Charge :

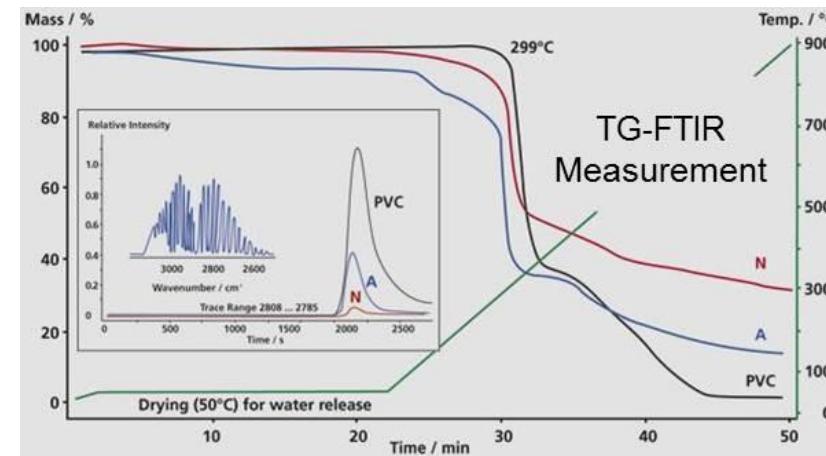
- Amy Zuria – amyzuria@utm.my
- Mr Muhamad Arif – m.arifmislet@utm.my



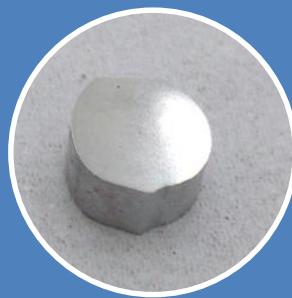
Function



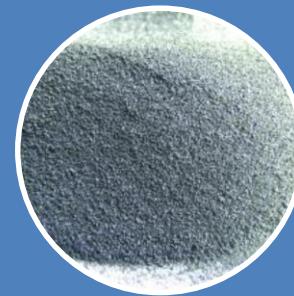
- Spectrum of absorption
- Emission
- Functional Group
- Weight Loss



Type of sample



Solid



Powder



Liquid

5 to 25 mg



Thermogravimetry With DSC



Brand : Pelkin Elmer

Model : STA8000 (Simultaneous Thermal Analysis)

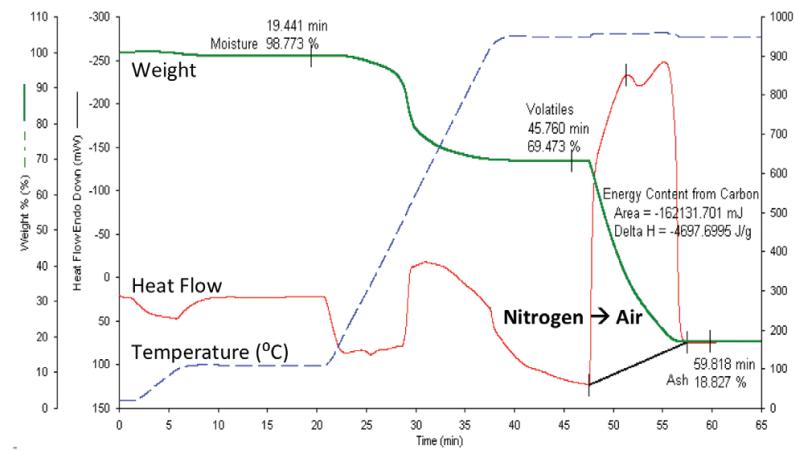
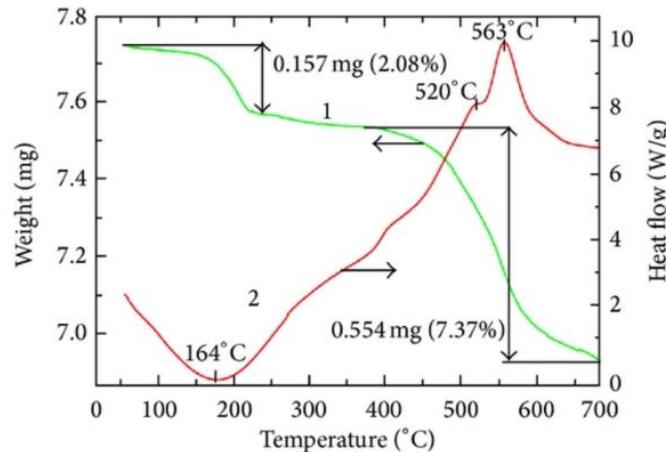
Location : Molecular Spectroscopy Laboratory

Person In Charge :

- Amy Zuria – amyzuria@utm.my
- Mr Muhamad Arif – m.arifmislet@utm.my

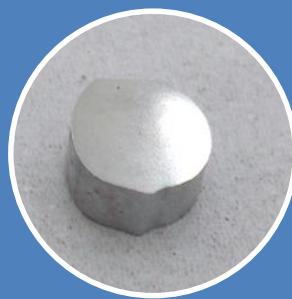


Function

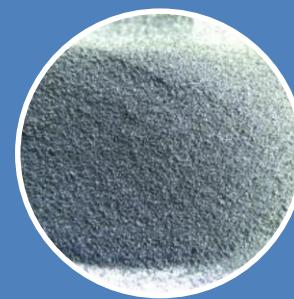


- Weight change and heatflow measured under perfect identical test conditions with a TGA/DSC deliver more information about composition, phase transitions and chemical reactions.
- Measures both heat flow (Differential Scanning Calorimetry) and weight changes (thermogravimetry) in a material as a function of temperature or time in a controlled atmosphere.

Type of sample



Solid



Powder

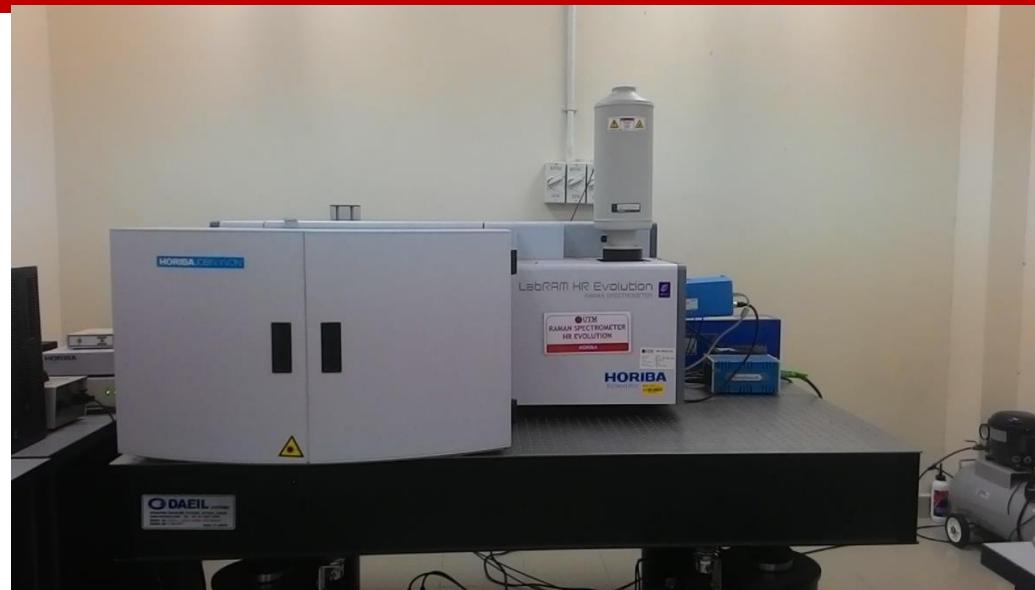


Liquid

5 to 25 mg



Labram Hr Evolution



Brand : Horiba Scientific

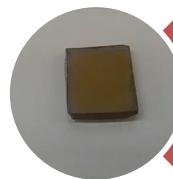
Model : Labram hr evolution

Location : Advanced Nano Raman Photoluminescence laboratory

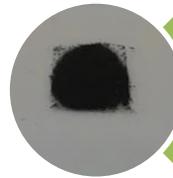
Person In Charge :

- Md Razali Rehat -mdrazali@utm.my
- Amy Zuria – amyzuria@utm.my

Type of sample



Solid (1 x 1 cm)



Powder (1 mg)



Liquid (10 ml)

Laser Type

**Visible (633 nm): Helium Neon
Ultra violet (325 nm) : He-Cd**

XpLoRA PLUS



Brand : Horiba Scientific

Model : XpLoRA PLUS

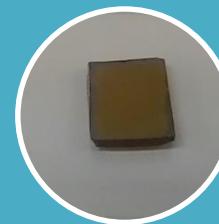
Location : Advanced Nano Raman Photoluminescence laboratory

Person In Charge :

- Md Razali Rehat -mdrazali@utm.my
- Amy Zuria – amyzuria@utm.my



Type of sample



Solid



Powder



(1 x 1 cm)



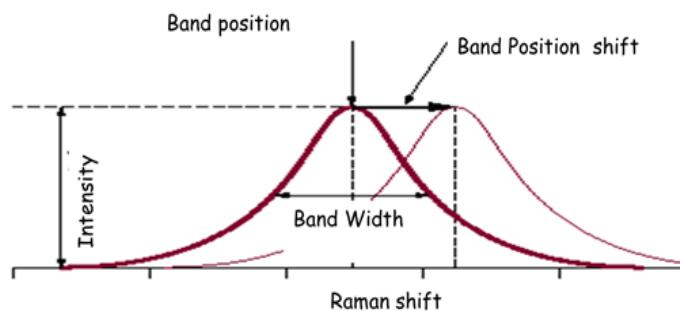
1 mg

Laser Type

532 nm, 20-25mW
785 nm, 100mW

Function

Qualitative and quantitative information



- **Band Position :**

- Qualitative studies
- Identification of functional groups

- **Band Intensity:**

- Concentration (% level)
- Molecular orientation (polarized)

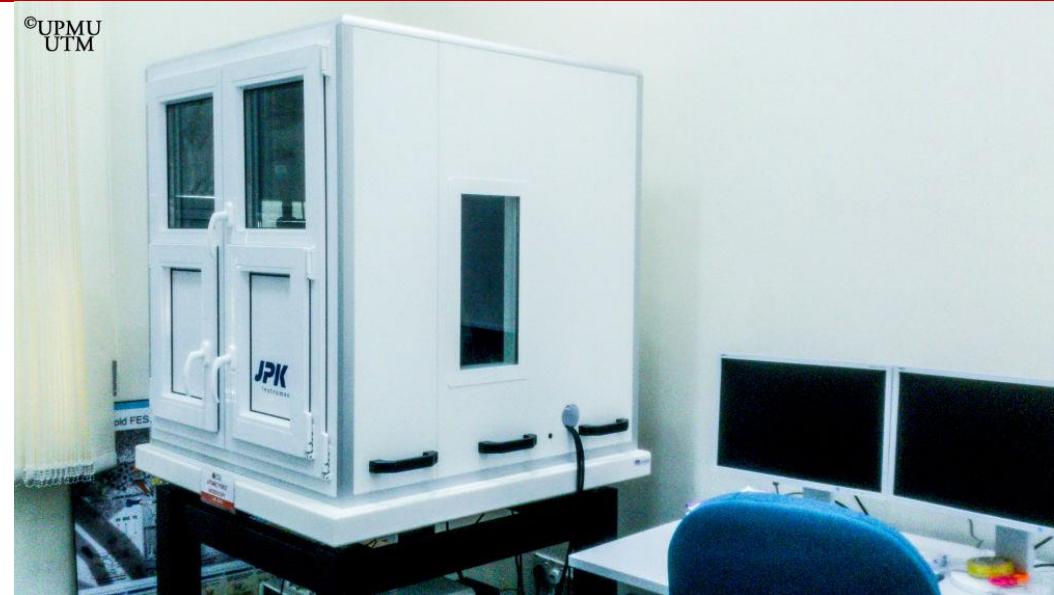
- **Band Shift :**

- Stress and strain measurement

- **Band width :**

- Amorphous/Crystalline phases

Atomic Force Microscopy



Brand : Zeiss

Model : JPK Instrument

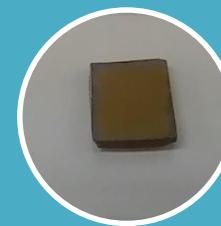
Location : Advanced Nano Raman Photoluminescence laboratory

Person In Charge :

- Mohd Izzam Bin Idrus –m.izzam@utm.my
- Amy Zuria – amyzuria@utm.my



Type of sample



Solid



Powder

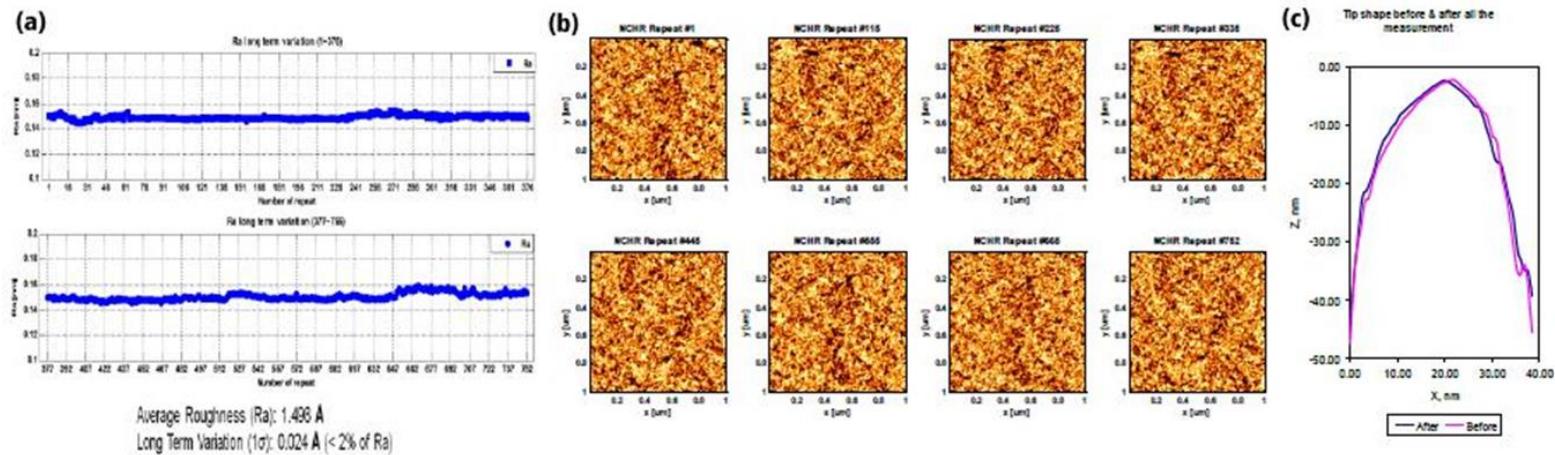
(Max : 2 x 7 cm X 4mm)

1 mg

Dry Sample

Non Sticky

Function



- To measure a roughness of a sample surface at a high resolution, in order to distinguish a sample based on its mechanical properties.

Operating Hours

- Sun- Wed : 08.30am-05.00pm (Run & Analysis Sample)
- Thursday : 08.30am-03.30pm (For appointment & consultation only)

Contact us

For more inquiries & details, you can contact :

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RAMAN AFM : 07-5557786
TGA : 07-5610235
SAXS :07-5610269

Thank You