NUS National University of Singapore	**Department of Physics National University of Singapore**	**Ref. No**	*SOP/001*
Standard Operation Procedure **Title: Shimadzu UV-2600 UV-Vis Spectrophotometer**		**Rev. No**	*003*
		Pages:	*6*
Lab: Nanomaterials & Devices Group			

Written by	Approved by	Issue date	Review date
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1. Purpose

The objective of this SOP is to provide guidelines to all the laboratory personnel on operating the Shimadzu UV-2600 UV-Vis spectrophotometer for measuring samples on planar substrates.

2. Scope

The procedure is applicable to all research staff, research students and technical staff working in the laboratory.

3. Responsibility

It is the responsibility of the PI in conjunction with the laboratory I/C to ensure that all research and technical staff and students are advised, prepared and trained.

3.1. Principal Investigator

The Principal investigator is responsible for the implementation of these guidelines and takes ownership of all research and technical staff, graduate and undergraduate students under his charge in ensuring that they will carry out their activities in a reasonably practicable manner. The PI has to ensure that all the above mentioned personnel are adequately advised, prepared and trained.

3.2. Staff / Students

All research and technical staff and graduate students are under the obligation to work and behave safely and are responsible for taking care of their own health and safety and not placing themselves or others at risk of injury

4. Personal protective equipment

Wear nitrile gloves (or glove material impermeable and resistant to the substance) and covered shoes. Wear additional protective gear if necessary; consult risk assessment/material safety data sheet for handling of measurement sample.

5. Safety precautions

Inspect equipment to be used and ensure all are in proper working condition. Report any equipment deficiencies prior to use.

6. Procedure

6.1. Setting up the equipment

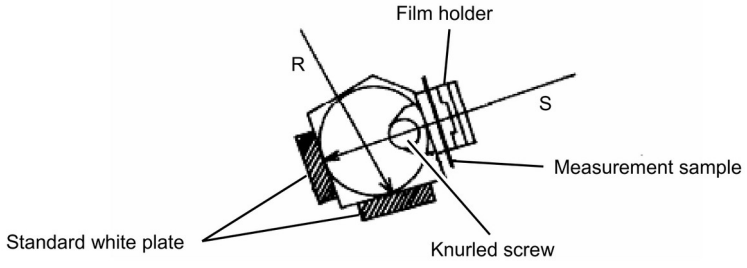
- Turn on the equipment via the switch at the right side of the spectrophotometer.
- Allow the spectrophotometer to start up and wait for the front green indicator to stop blinking. Note: Do not open the lid during this step.
- Open the *UVProbe* software.
- Click on the Connect button and wait for the checks to complete.
- Click on the in the toolbar to display the *Spectrum Method* window.
- Under the [Measurement] tab, set the wavelength range, scan speed and sampling interval.

6.1.1. For transparent substrate (Transmittance)

- Under the [Instrument Parameters] tab, set
  - Measuring Mode: **Transmittance**/Absorbance
  - Slit Width: 5.0 - when slit width is reduced, light intensity is also reduced and thus noise increases

- Detector Unit: External(2Detectors) - we are using ISR-2600Plus
- Light Source Change Wavelength: 323 - change the wavelength as required e.g. when there is a spectrum peak near the default switching wavelength or when you do not wish to switch the light source during measurement
- Detector Change Wavelength: 830 - change the wavelength as required e.g. when there is a spectrum peak near the default switching wavelength or when you do not wish to switch the light source during measurement
- S/R Exchange: Normal
- Accumulation: 2.0
- Stair Correction: ON

- Secure standard white plates at the exit windows of both the reference and sample sides of the integrating sphere.



- Click on Baseline to perform baseline correction.
- Attach sample to holder with tape. Ensure region of interest is against the holder window so that light is able to transmit.

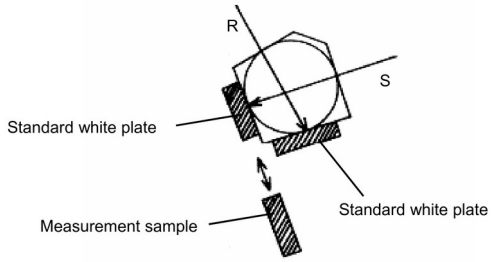
6.1.2. For powder/flakes on opaque substrates (Diffuse Reflectance)

- Under the [Instrument Parameters] tab, set

  - Measuring Mode: **Reflectance**/Absorbance

- Slit Width: 5.0 - when slit width is reduced, light intensity is also reduced and thus noise increases
- Detector Unit: External(2Detectors) - we are using ISR-2600Plus
- Light Source Change Wavelength: 323 - change the wavelength as required e.g. when there is a spectrum peak near the default switching wavelength or when you do not wish to switch the light source during measurement
- Detector Change Wavelength: 830 - change the wavelength as required e.g. when there is a spectrum peak near the default switching wavelength or when you do not wish to switch the light source during measurement
- S/R Exchange: Normal
- Accumulation: 2.0
- Stair Correction: ON

- Secure standard white plates at the exit windows of both the reference and sample sides of the integrating sphere.



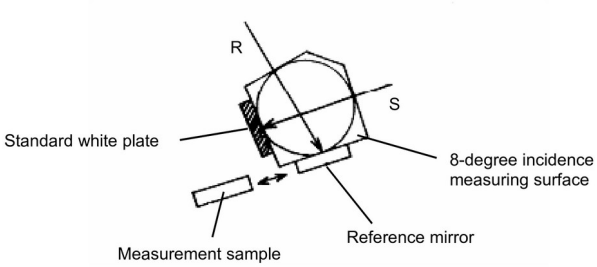
- Click on Baseline to perform baseline correction.
- Replace standard white plate on exit window on the sample side with the measurement sample.

6.1.3. For film on opaque substrates (Relative Specular Reflectance)

- Under the [Instrument Parameters] tab, set

- Measuring Mode: **Reflectance**/Absorbance
- Slit Width: 5.0 - when slit width is reduced, light intensity is also reduced and thus noise increases
- Detector Unit: External(2Detectors) - we are using ISR-2600Plus
- Light Source Change Wavelength: 323 - change the wavelength as required e.g. when there is a spectrum peak near the default switching wavelength or when you do not wish to switch the light source during measurement
- Detector Change Wavelength: 830 - change the wavelength as required e.g. when there is a spectrum peak near the default switching wavelength or when you do not wish to switch the light source during measurement
- S/R Exchange: **Reverse**
- Accumulation: 2.0
- Stair Correction: ON

- Secure a reference mirror at the reference exit window and a standard white plate at the sample exit window.



- Click on Baseline to perform baseline correction.
- Replace reference mirror with measurement sample.

6.2. Performing the measurement and saving the data

- Click Start to start measure.

- When the measurement is completed, you can view the result by clicking on in the toolbar. You can save the result as a .txt file by navigating to [Save] under [File] in the menu bar. In the saving dialog, choose *"Data Print Table (*.txt)"* as the *"Save as type"*.

6.3. Shutting down the equipment

- Click Disconnect and exit *UVProbe*.
- Switch the spectrophotometer off via the button on the right.

7. Revision History

Date Revised	Revision No.	Author	Revision Summary
12.10.2015	001	Amara Kiran Kumar	
05.10.2018	002	Zhang Qi	
16.12.2021	003	Justin Zhou Yong	Adopted standard format. Revised SOP to include more details.