



Standard Operating Procedure (SOP)

Filmerics F40 (MET-04)

In case of emergency please call 911

*For any other major safety concern contact EHRS at: 215-898-4453 or
via email: ehrs@ehrs.upenn.edu*

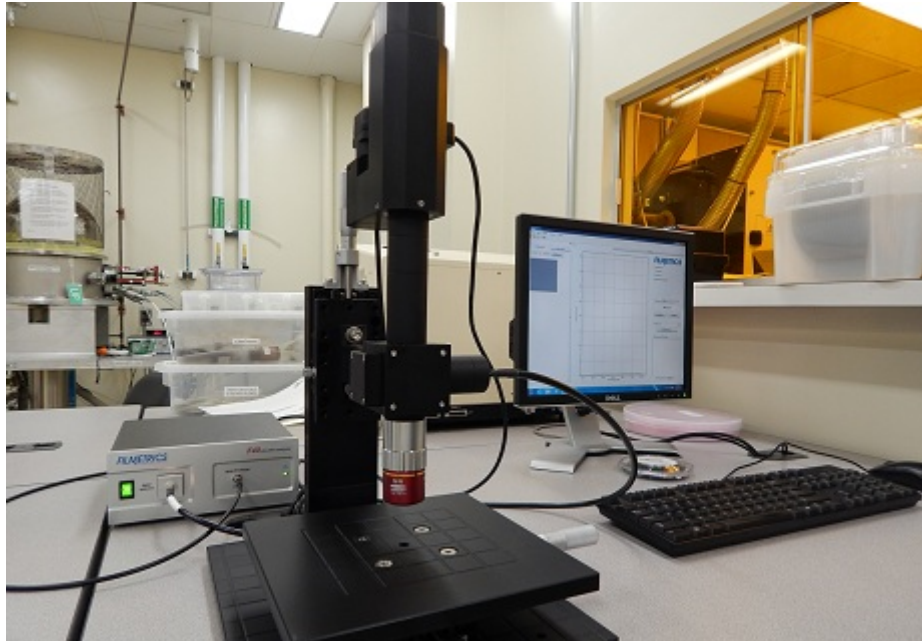
**If there is an error on the system/tool please report it
on IRIS, we will take care of it**

**Please *DO NOT* run diagnosis without a staff
member's approval**

General safety tips and common mistakes

- 1) Make sure that you are logged into the tool on IRIS before use. If you do not log in, you cannot run the tool.

Filmetrics F40



Procedure Overview

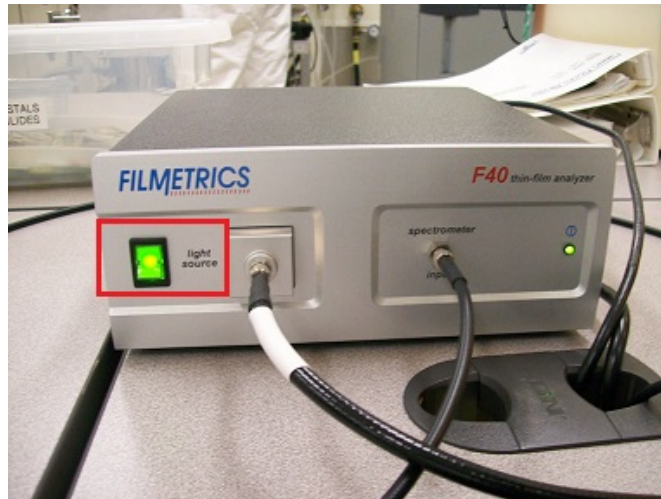
- 1 Check-in
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- 3 Baseline and reference check
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 - 3.1.2 Focus the camera/optics
 - 3.2 Measurement on the standard SiO₂ sample
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1. Check-in

1.1. Log-in on the IRIS scheduler

2. Start-up

2.1. Turn on light source on front panel of main F40 unit



2.2. Wait at least 5 minutes for proper lamp warm-up
3. Ensure “FILMeasure” software program is open



If software is not running, double-click “FILMeasure” icon on the tool’s PC desktop

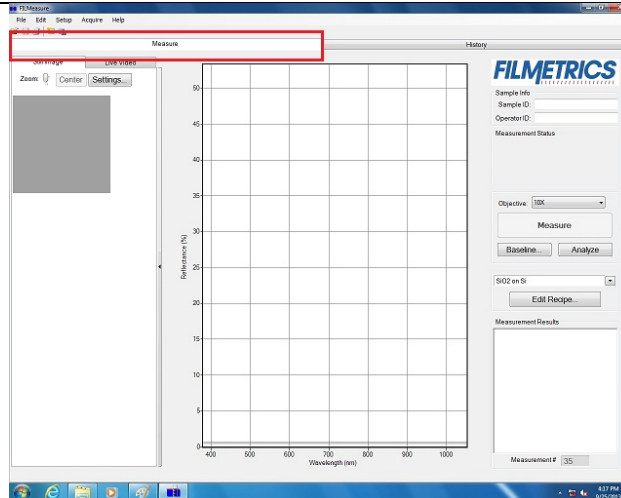
3. Baseline and reference check	
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To obtain accurate measurements, baseline and reference check the F40 at the beginning of each tool reservation and/or when switching between thin film types (e.g.: Oxide, then photoresist)

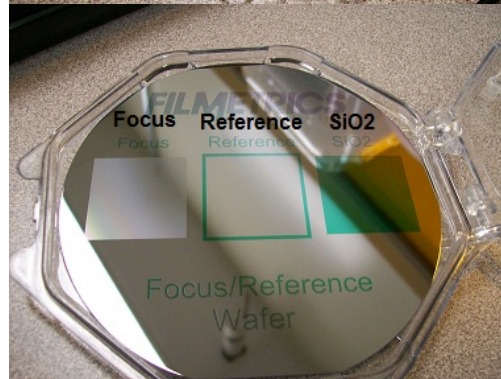
3.1 Calibration

3.1.1 Focusing the camera/optics

3.1.1.1. Verify that the "Measure" tab at the top of the screen is selected.

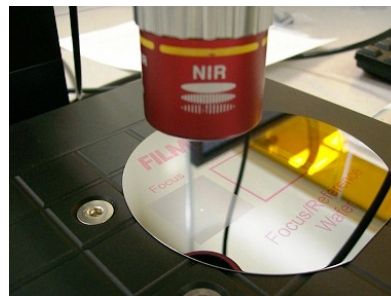


3.1.1.2. Locate the 4" Filmetrics wafer labeled "Focus/Reference Wafer"



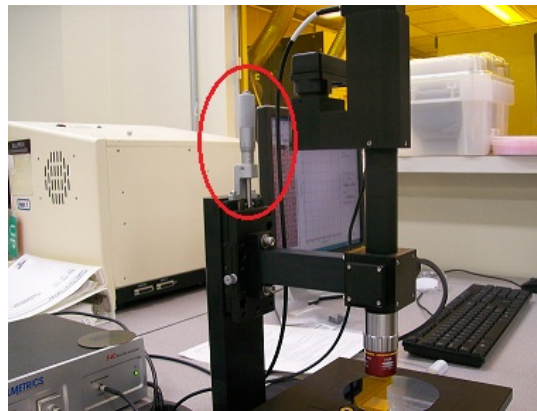
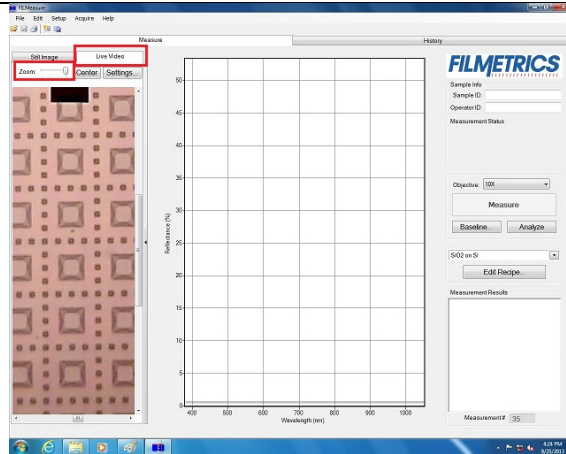
3.1.1.3 Place "Focus" field on the "Focus/Reference Wafer" beneath the objective lens.

3.1.1.4. Open the "Live Video" tab, so that the CCD camera will be active.



Focus the camera/optics
3.1.1.5. Zoom to highest
camera magnification.

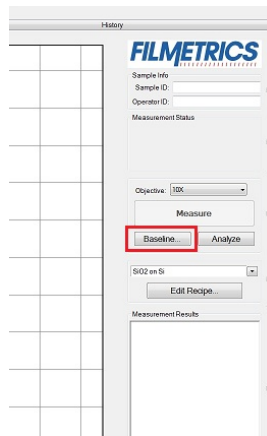
3.1.1.6. Adjust camera
focus with the z-
micrometer.



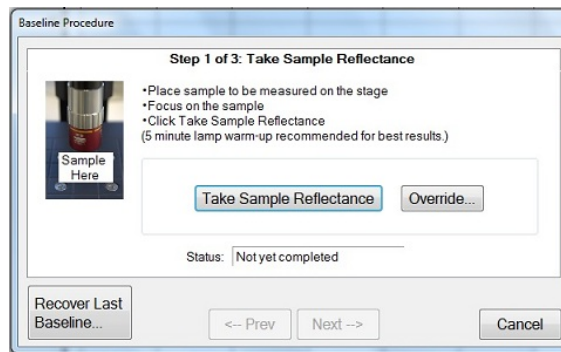
3.2 SiO₂ standard measurement

3.2.1 Step 1

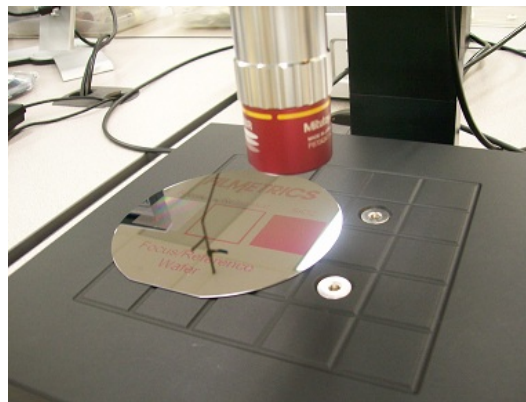
3.2.1.1. Click “baseline”



3.2.1.2. The following dialog box appears.



3.2.1.3. Place “SiO₂” field on the “Focus/Reference Wafer” beneath the objective lens, as the standard SiO₂ sample.

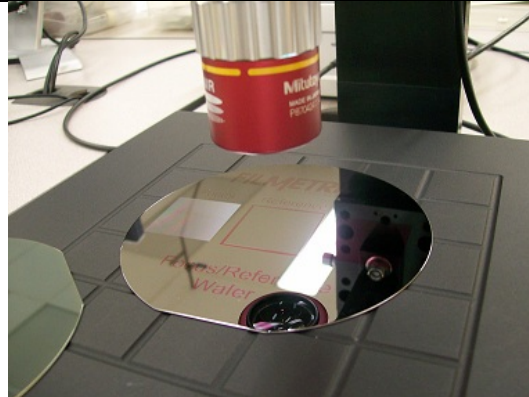


3.2.1.4. Focus on the sample using the CCD image in the "Live Video" tab, if necessary.

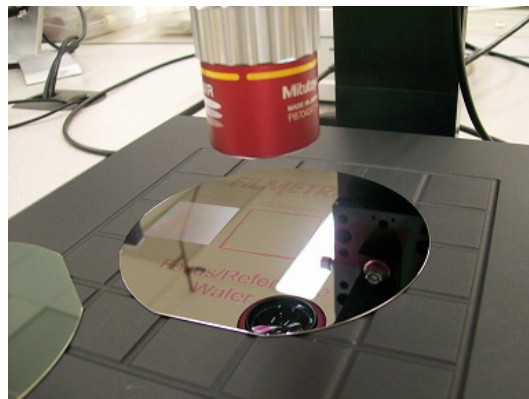
3.2.1.5. Click the "Take Sample Reflectance" button.

3.2.2 Step 2

3.2.2.1. The dialog box for step 2 is opened when step 1 is completed.



3.2.2.2. Place the "Reference" field on the "Focus/Reference Wafer" beneath the objective lens.



3.2.2.3. Focus on the "Reference" field using the CCD image in the "Live Video" tab, if necessary.

3.2.2.4. Choose "Si" from the pull-down menu of the "Reflectance Standard" box.

3.2.2.5. Click the "Take Reflectance Standard" button.

BK7
Si
Enter Constant...
Acrylic
Al2O3
Au
BK7
BSG
CaF2
Fused Silica (2-Sided)
GaAs
GaAs_hot
Ge
InP
NiP
Polycarbonate
Polyolefin
Polystyrene
Quartz
Si
SiO2
Clear Most Recent List...

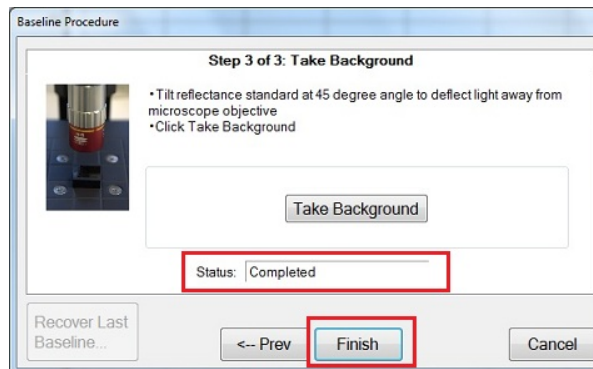
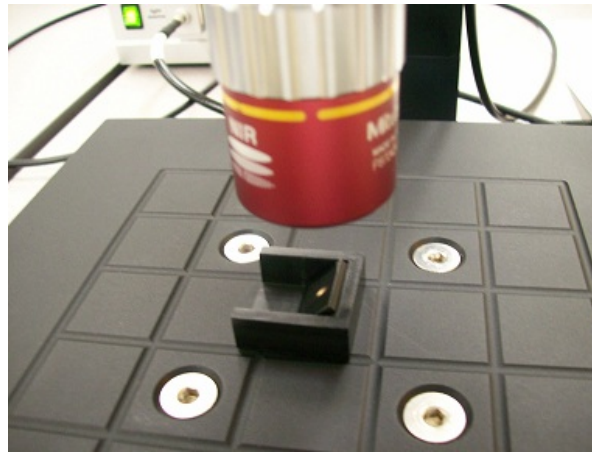
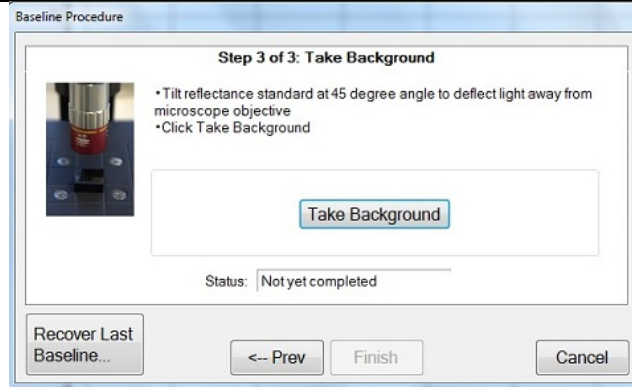
3.2.3 Step 3

3.2.3.1. The dialog box for step 3 is opened when step 2 is completed.

3.2.3.2. Place the black block containing the 45° angled reflectance substrate beneath the objective lens.

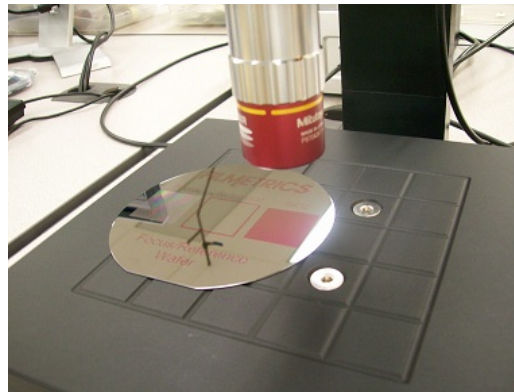
3.2.3.3. Click the "Take Background" button.

3.2.3.4. Click "finish" when done

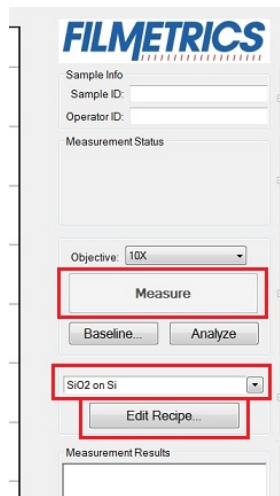


3.2.4 Measurement

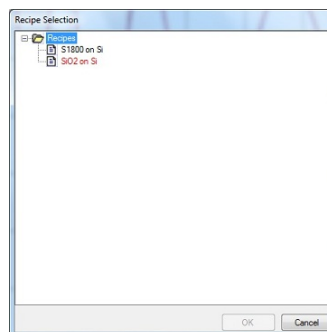
3.2.4.1. Place “SiO₂” field on the “Focus/Reference Wafer” beneath the objective lens.



3.2.4.2. Click the down arrow in the box above the “Edit Recipe” button.



3.2.4.3. The following dialog box appears.

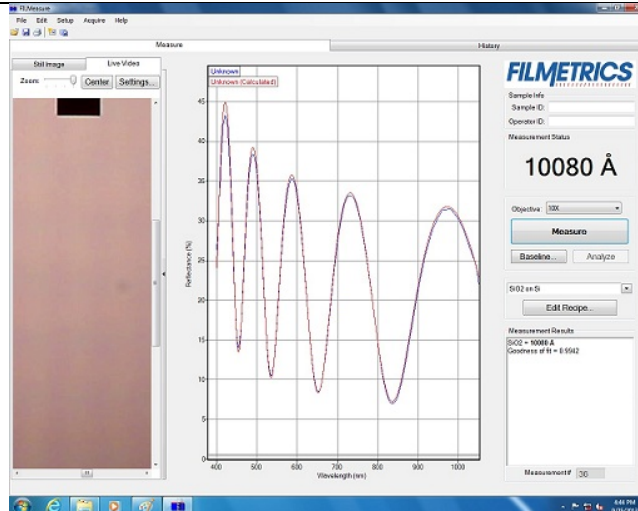


3.2.4.4. Select “SiO₂ on Si” from the dialog box, and click “OK”.

3.2.4.5. Click “Measure” to obtain SiO₂ thickness (standard = 10080Å)

3.2.4.6. If measurement is $\geq \pm 42$ Å of expected thickness, contact lab staff

3.2.4.7. Remove the Focus/Reference Wafer.



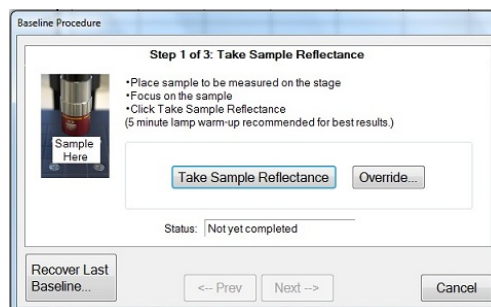
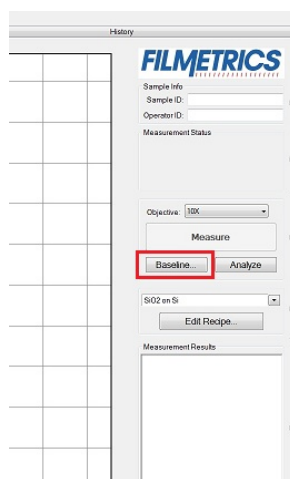
4. Measurement on Sample

* **Note:** If the substrate of your sample is still a Si wafer after the above process, then skip 4.1 to 4.3, and go to 4.4 for measurement.

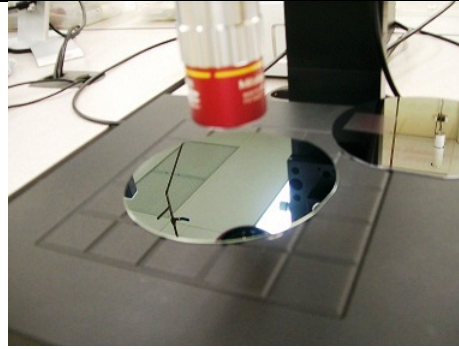
4.1 Baseline-Step 1

4.1.1. Click “baseline” and follow on-screen instructions

4.1.2. The following dialog box appears.



4.1.3. Place your sample beneath the objective lens.
4.1.4. Focus on the sample using the CCD image in the "Live Video" tab, if necessary.
4.1.5. Click the "Take Sample Reflectance" button.



4.2 Baseline-Step 2

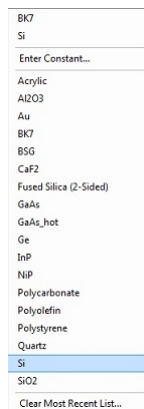
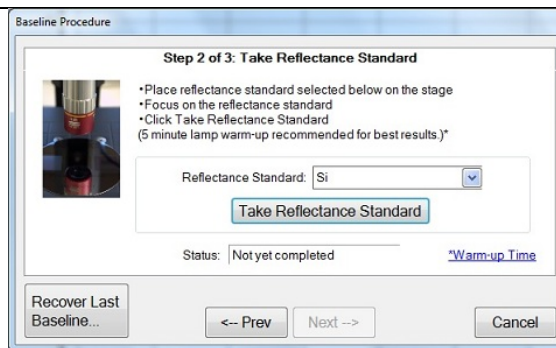
4.2.1. The dialog box for step 2 is opened when step 1 is completed.

4.2.2. Place the blank substrate beneath the objective lens.

4.2.3. Focus on the "Reference" field using the CCD image in the "Live Video" tab, if necessary.

4.2.4. Choose the substrate material from the pull-down menu of the "Reflectance Standard" box.

4.2.5. Click the "Take Reflectance Standard" button.



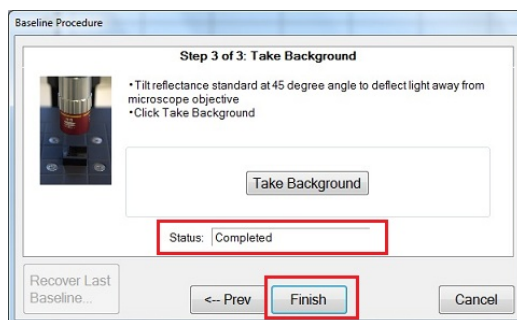
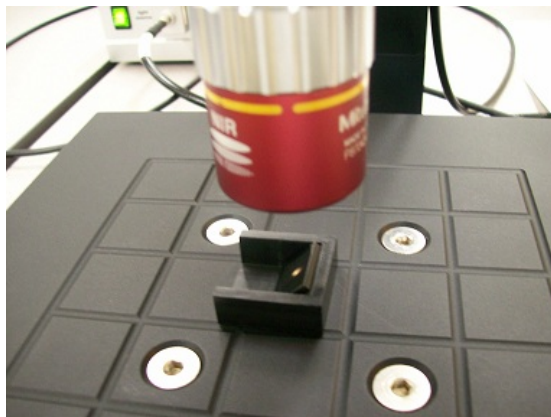
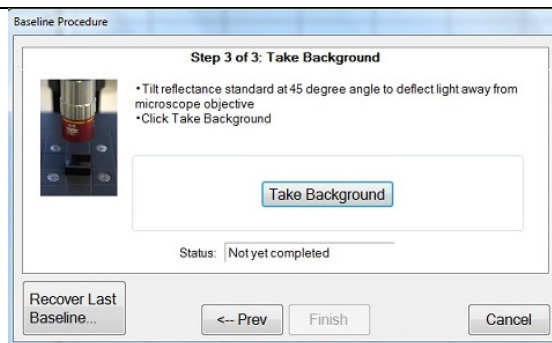
4.3 Baseline-Step 3

4.3.1. The dialog box for step 3 is opened when step 2 is completed.

4.3.2. Place the black block containing the 45° angled reflectance substrate beneath the objective lens.

4.3.3. Click the "Take Background" button.

4.3.4. Click "finish" when done



4.4 Creating/editing measurement recipes

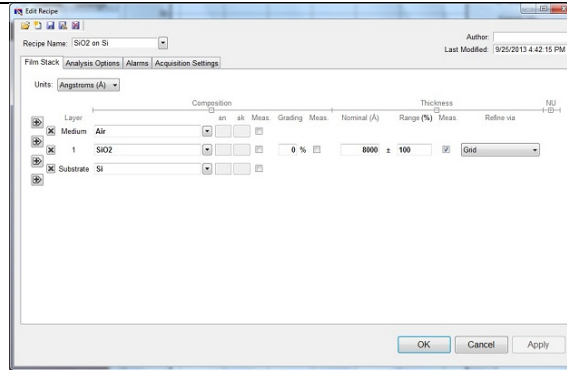
4.4.1. Select desired recipe from pull-down menu above the “Edit Recipe” button and click “OK”.

4.4.2. Click “Edit Recipe” to open the "Edit Recipe" dialog box.

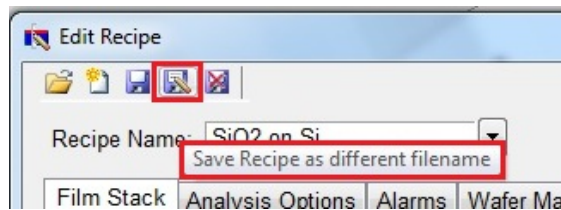
4.4.3. Click “film stack” to add, remove, or change film types in the stack to be measured

4.4.4. When done with edits, click “apply” then “OK” to apply changes temporarily

4.4.5. To save an edited recipe as a new recipe, click “apply”, then “save recipe as different filename” (represented by the “disk with pencil” icon), rename, then click “OK”



Note: To change or add the parameters, check Meas box, and change the parameters.



4.5 Measuring your sample and reviewing data

4.5.1. Place your sample beneath the objective lens.

4.5.2. Focus on your sample.

4.5.3. Select the desired measurement recipe, edit and/or “save as”, if desired

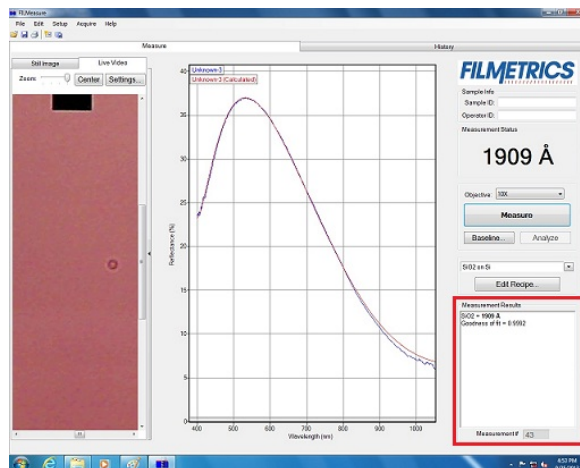
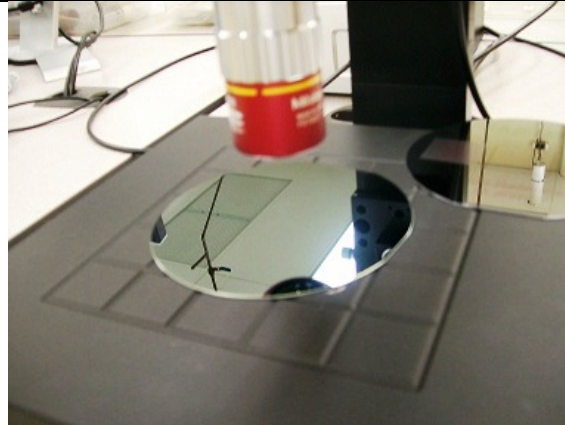
4.5.4. Use live video feed and X & Y micrometers to locate area to be measured

Use “center” to move spot measurement location to center of live video display

Use “settings” to adjust spot size for measuring, as needed

Use “zoom” to help locate smaller features/areas to be measured

4.5.5. Click “Measure” and view results in the lower right hand corner of the screen



5. Leaving the tool in an “idle” state

5.1. When done using the F40, turn off the light source only, unless another

will be using the tool immediately after you 5.2. Leave the FILMeasure software open 5.3. Leave main unit power on	
6. Check-out Log-off the IRIS scheduler	

Feel free to contact the staff members with any questions about your process and the tool.

Last modified: 12/6/2021 by Hiromichi Yamamoto