

## GENERAL PROCESS AND OPERATION SPECIFICATION

### Ocean Optics Metrology System

#### I. SCOPE

- a. The purpose of this document is to describe requirements and basic operating instructions for the Ocean Optics. The Ocean Optics tool is intended for

#### II. SAFETY

- a. Be sure that you are trained and signed off to use this equipment.
- b. Be sure to keep all doors and protective shields in place before operating this equipment.
- c. Use care when operating around high voltage or high current..
- d. If you are unsure about any procedure or indication while operating this equipment be sure to contact a staff member or trainer for assistance.

#### III. APPLICABLE DOCUMENTS, MATERIALS AND REQUIREMENTS

- a. Materials in Nanocalc database are listed in Appendix 1

#### IV. OPERATION

- a. Fill out the Ocean Optics logbook to record a history of materials and process parameters.
- b. Normal operations – follow steps described below. The factory manual is available on line, or on the PC for the tool to provide more detailed information.
- c. Restart the Ocean Optics Metrology System
- d. Turn on both Deu & Halogen. They system may take a few minutes to warm up. Once the switch is in the 'on' position there should be light coming from the sensor.
- e. Open the NanoCalc software and place the silicon strip (not colored and metallic strip) of test step wafer underneath the sensor.
- f. Set the deposited material to SiO<sub>2</sub> (therm) and the measurement range to wide. The range of the graph can be increased by right and left clicking on the left and right boundaries of the graph.
- g. Click on 'continuous' (under reference). Click on 'reference.' Increase or decrease the scale of the graph with the buttons on top of the graph. (+10, +1, ...)
- h. Set continuous to off then 'save and quit'
- i. Now we can see what thickness of SiO<sub>2</sub> the Metrology System detects on the step wafer by pressing 'Measure' then 'Analyze.' If the strip of the test wafer is under the sensor, the system should detect close to 0 nm of SiO<sub>2</sub>. This can vary depending on how clean the step wafer is. If the thickness is above 10nm (d1 = 10nm) test different spots in the silicon strip to make a more accurate reading.
- j. Test other strips on the test wafer. The thickness of SiO<sub>2</sub> increases to 100nm, 200, 300, 400
- k. Black line expected, red measured

V. QUALITY

- a. Substrates and thin film materials used in this machine are intended to provide a wide variety of alternatives to AggieFab users. No guarantee is made regarding effects of cross contamination due to particular substrates or targets in the history of operations for this tool on future users.

VI. SIGNATURES AND REVISION HISTORY

- a. Author of this document: Larry Rehn and Cheng-Chung Chang
- b. Author Title or Role: Technical Manager/Student Lab User
- c. Date: 5/2/2014
- d. Revision: Original Issue

Approvals:

Technical Manager Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Revision History:

<b>Revision</b>	<b>Author</b>	<b>Date</b>
Original Issue	E. Richards	7/16/2014
Rev A		
Rev B		
Rev C		

# APPENDIX 1

## Materials included in Nanocalc Database

<b>Semi-conductors</b>	Si poly 30	<b>Nitrides</b>	AZ NOVA 2071	<b>Resists</b>	OiR 64	ma-N400
AlGaAs19	Si poly 40	Si <sub>3</sub> N <sub>4</sub>	AZ OFPR 800	<b>Olin</b>	OiR 643	ma-P1200
AlGaAs31	Si poly 50	SiON 00	AZ111 exp	APII	OiR 644	<b>Metals</b>
AlGaAs41	Si poly 60	SiON 20	AZ111 non exp	ARCH2	OiR 670	Ag
AlGaAs49	Si poly 70	SiON 40	AZ1350H exp	ARCH5000	OiR 672	Al
AlGaAs59	Si poly 80	SiON 60	AZ1350J exp	BPRS-100	OiR 897	Au
AlGaAs70	Si poly 90	SiON 80	AZ1350J non exp	HiPR 6512	OiR 906	Co
AlGaAs80	<b>Oxides</b>	<b>Glasses</b>	AZ1518	HiPR 6514HC	OiR 907	Cr
GaAs	Al <sub>2</sub> O <sub>3</sub>	BK7	AZ1518 SFD	HiPR 6517	OiR 908	Cu
GaAs 100	CuO	<b>Polyimides</b>	AZ1518HS WI	HPR 200 500	<b>Resists</b>	Mo
GaAs 111	SiO	Hitachi PIQ	AZ4500	OCG 825	<b>Shipley</b>	Ni
Ge	SiO <sub>2</sub> (therm)	<b>Resists</b>	AZ6210B	OCG 895	SPR500	Ni50Cr50
Ge 100	SiO <sub>2</sub> (CVD)	<b>Clariant</b>	AZ7209	OCG 896-10i	SPR955	Ta
Si	Ta <sub>2</sub> O <sub>3</sub>	AQUATAR	AZ7510	OCG NegRes	UV5	Ti
Si porous	Ta <sub>2</sub> O <sub>5</sub>	AZ EL 2015	AZ7700	OFR 6800	UV6	W
Si poly 1	TiO <sub>2</sub>		BARLI	OiR 32	<b>Resists</b>	<b>Others</b>
Si poly 2	TiO <sub>2</sub> α		DX46	OiR 5503	<b>Others</b>	Air
Si poly 10	Y <sub>2</sub> O <sub>3</sub>			OiR 620	ARU400	SiC
Si poly 20	ZrO <sub>2</sub>			OiR 622		