

305 810

See
3954 us

NL

FINAL TECHNICAL REPORT

**ULTRA-LOW LOSS FILMS BY ION-BEAM SPUTTERING FOR NOVEL POLYMER
AND GLASS BASED OPTOELECTRONIC DEVICES
(DURI 98/99)**

GRANT NUMBER F49620-98-1-0273

Submitted To:

AFSOR/NL
110 Duncan Avenue
Room B115
Bolling AFB
Washington, D.C. 20332-8050

Submitted By:

Nasser Peyghambarian
Optical Sciences Center
The University of Arizona
Tucson, Arizona

20000718 092

August, 1999

REPORT DOCUMENTATION PAGE AFRL-SR-BL-TR-00-

d
188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate for Information Operations and Reports, Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503

0259

ering and maintaining
ding suggestions for
2, and to the Office of

1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE August 31, 1999	3. REPORT TYPE AND DATES COVERED Final Technical; 3/1998 - 8/1999	
4. TITLE AND SUBTITLE Ultra-Low Loss Films by Ion-Beam Sputtering for Novel Polymer and Glass Based Optoelectronic Devices			5. FUNDING NUMBERS G# F49620-98-1-0273	
6. AUTHOR(S) Nasser Peyghambarian Sergio Mendes				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) The University of Arizona Sponsored Project Services 888 N. Euclid #510 Tucson, Arizona 85722-3308			8. PERFORMING ORGANIZATION REPORT NUMBER N/A	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) AFSOR/NL 110 Duncan Ave., Room B115 Bolling AFB Washington, D.C. 20332-8050			10. SPONSORING / MONITORING AGENCY REPORT NUMBER PO # F08671-9801134	
11. SUPPLEMENTARY NOTES N/A				
12a. DISTRIBUTION / AVAILABILITY STATEMENT N/A Unclassified		DISTRIBUTION STATEMENT A Approved for Public Release Distribution Unlimited		12b. DISTRIBUTION CODE
13. ABSTRACT (Maximum 200 Words) The purchased equipment was the Ionfab 300 Plus from Oxford Instruments. The Ionfab Plus Ion Beam System is configured for sputter deposition of high quality dielectric and metal oxide thin films for optical applications and for etching optical surfaces. The equipment has been an important tool in the OSC research and development of nano-structured optoelectronic components. Among them are electro-active waveguides for research in spectroelectrochemistry, dielectric multilayer stacks of active optical components, and integrated optical devices in glass and semiconductor materials.				
14. SUBJECT TERMS Ion-beam sputtering system; novel polymers, optoelectronics			15. NUMBER OF PAGES	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT	

NSN 7640-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. Z39-18
298-102

DTIC QUALITY INSPECTED 4

Final technical report for the equipment grant for the Ion-Beam Sputtering System purchase

The purchased equipment was the Ionfab 300 Plus from Oxford Instruments Inc. The total system price was \$ 430,000.00 with matching funds from the University of Arizona.

The Ionfab 300 Plus Ion Beam System is configured for sputter deposition of high quality dielectric and metal oxide thin films for optical applications and for etching optical surfaces. The major system features are:

- Ionfab 300 Plus base console with PC Plus hardware and software for operator interface of process control, wafer handling, data logging, and security access.
- Electropolished UHV process chamber with one set of removable stainless steel liners.
- Deposition Target Holder (4 x 6") with rotatable shield and two spare backing plates.
- Substrate holder and water-cooled clamping mechanism for 6" wafers, with gas admission and control system for backside cooling.
- One 15-cm-diameter ion source with automatic matching network for etching optical surfaces and ion assisted deposition.
- One 3-cm-diameter ion source with automatic matching network for depositing high quality films.
- Etch/deposition pumping layout for moisture sensitive materials with isolation gate valve.
- An Austin Scientific cryogenic Cryo-Plex 8LP cryo pump.
- Console mounted gas pod with 5 mass-flow-controlled gas lines. Four lines are dedicated to the ion sources, one to the chamber.
- Leybold XTM/2 quartz crystal film thickness monitor, single head detector with shutter.

The equipment has been an important tool in our research and development of nano-structured opto-electronic components. Among them are electro-active waveguides for research in spectroelectrochemistry, dielectric multilayer stacks for active optical components, and integrated optical devices in glass and semiconductor materials.