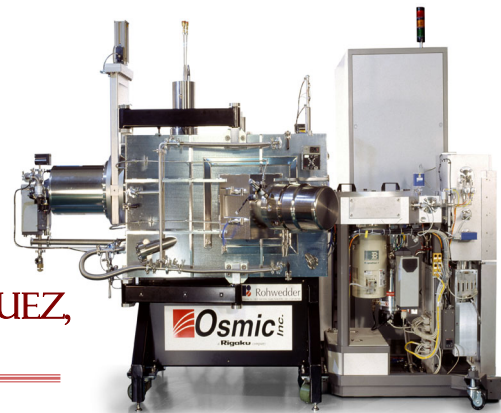
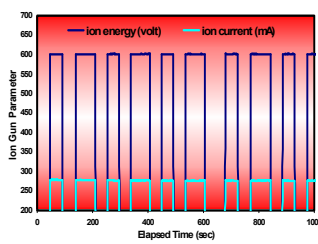
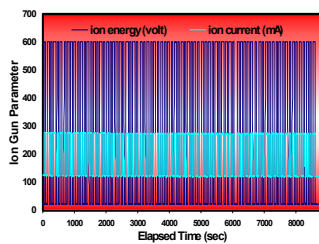
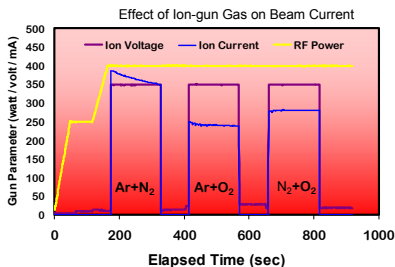


# INITIAL RESULTS OF NEW PHOTOMASK-BLANK DEPOSITION TOOL

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GARY FOURNIER, & YURIY Y. PLATONOV



## ION BEAM ANALYSIS

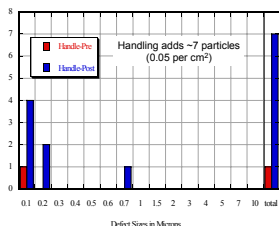


## ABSTRACT

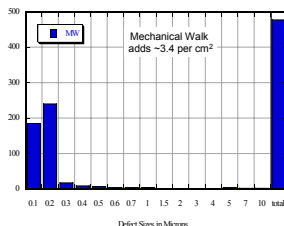
In a joint-development, Rohwedder and Osmic have designed and built a low-defect dual-ion beam reactive-sputtering tool. The tool has been specifically targeted for developing low-defect lithography mask photobank coatings intended as DUV absorbers and phase-shifting films. The Osmic / Rohwedder collaboration will continue into NGL - the present tool also serves as an R&D platform for EUVL mask blanks. The deposition tool and robotic substrate handler have been integrated and delivered to Osmic in the 2nd quarter of 2003. In this paper, we present initial capability for production of thin-film lithography coatings, including spectrophotometric performance, defect levels and film uniformity. Future reports will share results from more in-depth process development and optimization.

## DEFECTS

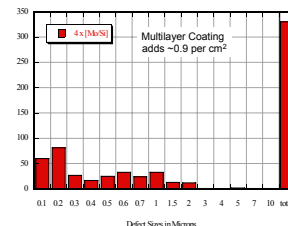
### HANDLING



### MECHANICAL



### COATING



## FEATURES

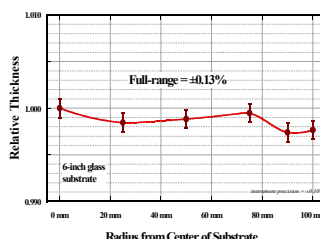
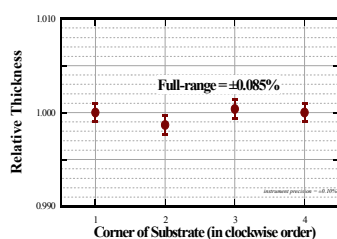
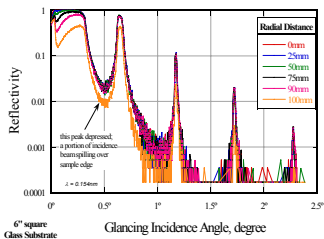
### SYSTEM

- DUAL ION GUNS: 150MM DIA, 0-15KEV, 400MA
- PRIMARY SPUTTER: FOCUSED BEAM
- ASSIST MODIFICATION/REACTIVE/ETCH BROADBEAM
- TARGETS - FOUR 12" DIA.
- PUMPING - CRYO & TURBO
- BROOKS - AUTOMATED HANDLING, SMIF COMPATIBLE, 5-BLANK CASSETTE
- CHAMBER SHIELDING (REMOVABLE)
- 0-90 RPM SUBSTRATE W/ VARIABLE DEPOSITION-ANGLE

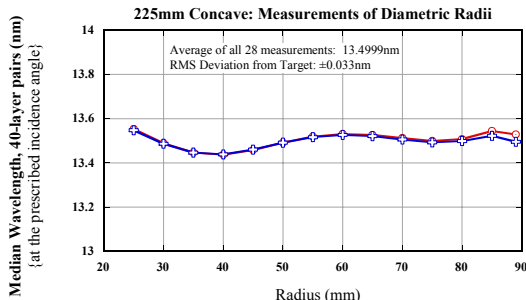
### SPUTTER GUN

- TARGET MATERIALS: METALS/ALLOYS, NITRIDES/OXIDES, COMBINATIONS
- INDEPENDENT CONTROL: GAS MIX (INER/T/REACTIVE), ION BEAM ENERGY (GRID VOLTAGE), SPUTTER ANGLE (0-60°)
- PRESSURE CONTROL: DUAL PUMP (CRYO & TURBO), THROTTLE VALVING OF TURBO, BLEED GAS VALVE

## UNIFORMITY



## LARGE OPTIC COATING



### ASSIST GUN

- DIRECT AT SUBSTRATE
- CONTROL OF REACTIVE SPECIES: OXIDATION/NITRIDIZATION/OXYNITRIDE, VARIABLE STOICHIOMETRY
- IN-SITU GROWTH MODIFICATION: MICROSTRUCTURE, STRESS, OPTICAL PROPERTIES, DENSITY
- INTERLAYER ETCHING / SMOOTHING
- DEPTH GRADING