# MEMS Process Capabilities

**For our customized MEMS offerings, LioniX International uses 1000 m² cleanroom space fully equipped with over 200 state of the art machines. We process 100 and 150 mm silicon, SOI, fused silica and glass wafers. Our strength is the production of customized MEMS in small to medium volumes, and to develop new aspects of the production process if necessary.**

## Lithography

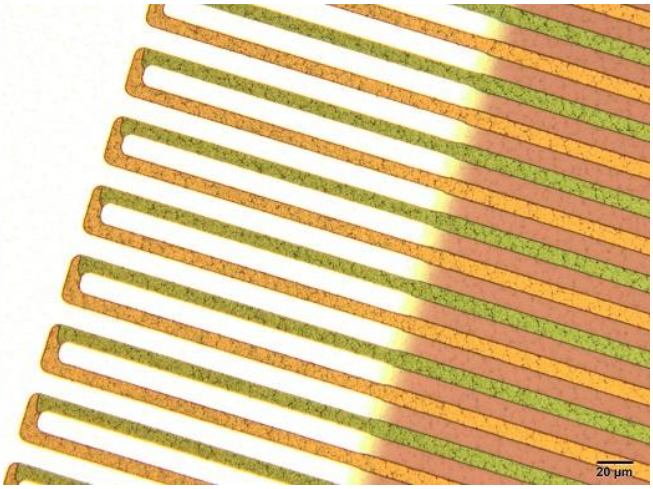
- Positive resists, thin and thick
- Lift of Resist
- Spray coater resist
- Polyimide, SU8
- Furnaces and Hotplates

## Aligners

- Near UV (350 – 450 nm)
- Back to Front side alignment and bonding

## LPCVD and Thermal Oxidation

- $SiO_2$ dry
- $SiO_2$ wet
- Low-stress Silicon Rich Nitride (SiRN)
- Stoichiometric $Si_3N_4$
- $SiO_2$ TEOS
- $SiO_2$-doped TEOS (B, P)
- Polysilicon and Amorphous Silicon
- $Ta_2O_5$




## Thermal Furnace Processes

- Drive In, Activation, Diffusion, SSD
- Reflow
- Wafer Bonding
- Densification, Annealing

## Plasma Deposition (PECVD)

- $SiO_2$
- $Si_3N_4$
- $Si_xN_y$
- BSG, PSG, BPSG
- Parylene

## Sputtering

- Various Multi-target Systems, RF Magnetron Sputtering
- Materials for adhesion, conduction, antidiffusion, Si contacts, Optical and Magnetic use
- Ag, Al, Al/Si , Au, B, Ce, Co, Cr, Cu, Cu/Ni, Er, Fe, ITO, Ni, NiFe, Mo, Nd, Pd, Pt, Rh, Si, $SiO_2$, Tm, Ta, Ti, Ti/W, W, Y, Yb, Zr

## Evaporation

- Various systems, Al, Ag, Au, Cr, Si, Ta, Ti, Pd, Pt and more

## Pulsed-Laser Deposition

- Piezo-electric layers (PZT)

## Implantation

- Boron, Phosphorous

## Wet Etching

- Silicon (KOH and TMAH)
- $SiO_2$ and glass (BOE, 50% HF, 1% HF)
- $SiN_4$ ($H_3PO_4$)
- Al, Ag, Au, Cr, Cu, CuNi, Mo, Ni, Ti

## Dry Etching
- DRIE (silicon, ICP and Bosch)
- DRIE (Fused Silica and Borosilicate glass)
- RIE (Si, $SiO_2$, $Si_3N_4$, $Si_xN_y$)
- RIBE (any material)

## Gas Phase Etching
- Si ($XeF_2$)
- $SiO_2$ (Vapor HF)

## CMP
- $SiO_2$

## Wafer Bonding
- Fusion bonding
- Direct bonding
- Anodic bonding
- Thermocompression bonding
- Eutectic bonding
- Epoxy bonding

## Cleaning and Stripping
- RCA1, RCA2, Piranha, $HNO_3$
- $O_2$ plasma
- Quick dump rinsers, Semitools, Dry spinners, US

## In-Process Inspection
- Optical Microscopes with Fluorescence and Dark Field
- Surface profiler
- Ellipsometers
- Resistivity mapper
- SEM
- AFM
- White Light Interferometer
- IR inspection tool
- Junction depth
- Microbalance
- Wafer thickness
- Contact Angle

## Back end, Assembly and Packaging
- Silicon dicing
- Glass dicing
- Flip chip bonder
- Pigtailing of optical chips
- Wedge bonding (Al, Gold)

## Wafer testing, Chip testing and Analysis
- **Electrical:** Various wafer probes, (manual and automatic, probe needles or probecards); CV, R, Parameter Analyzer
- **Optical**: Various stages, lightsources and detectors to measure waveguide properties such as insertion loss, coupling constants and spectral response.
- **Visual Inspection:** Microscopes
- **Mechanical:** Vibrometer
- **Material analysis:** SEM (HR, Various detectors, EDX), TEM, XPS, FIB

**Require a different process? Please inquire by sending an email to info@lionix-int.com**

Our chips drive your business

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