Wafer Dicing

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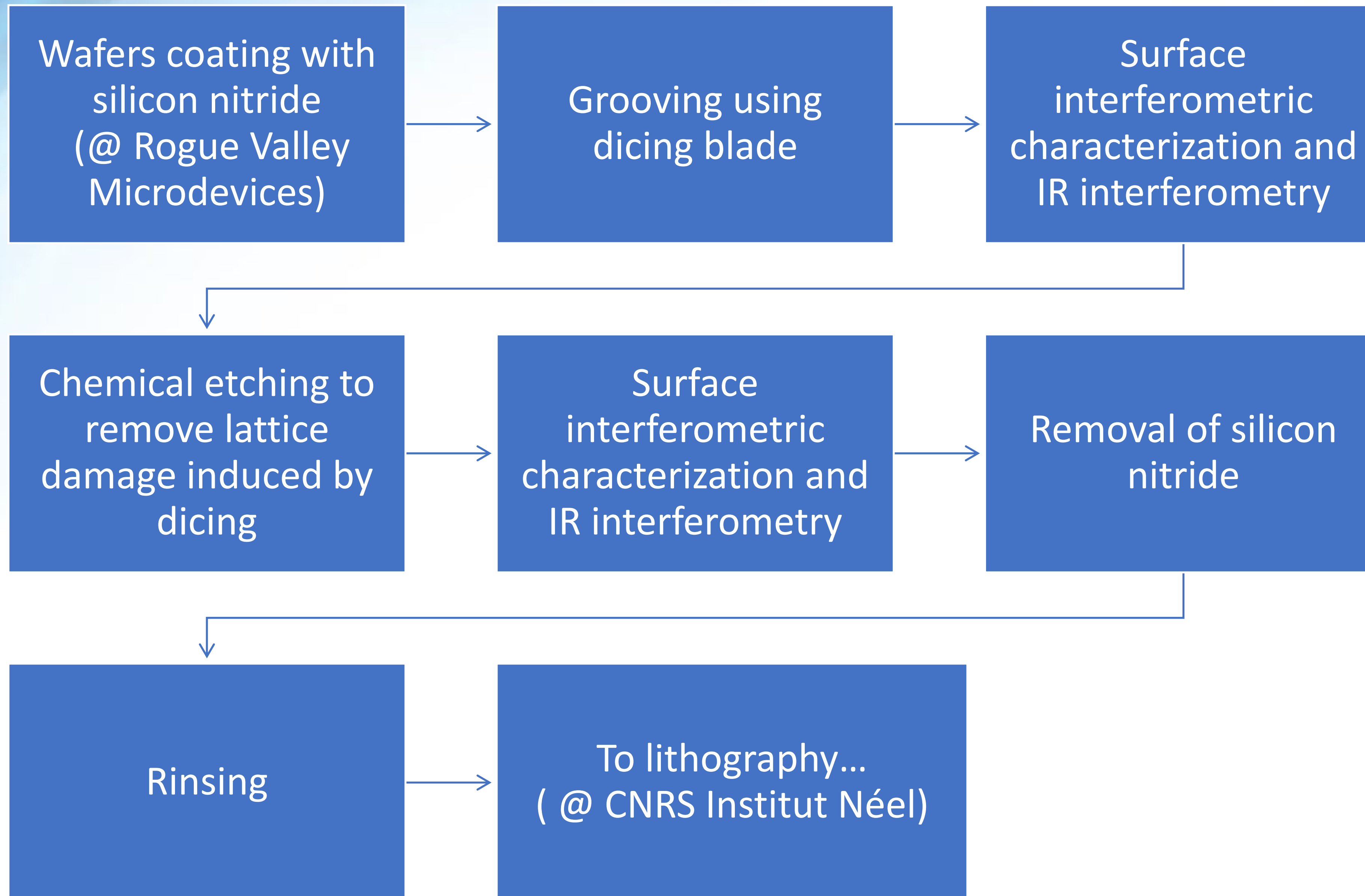
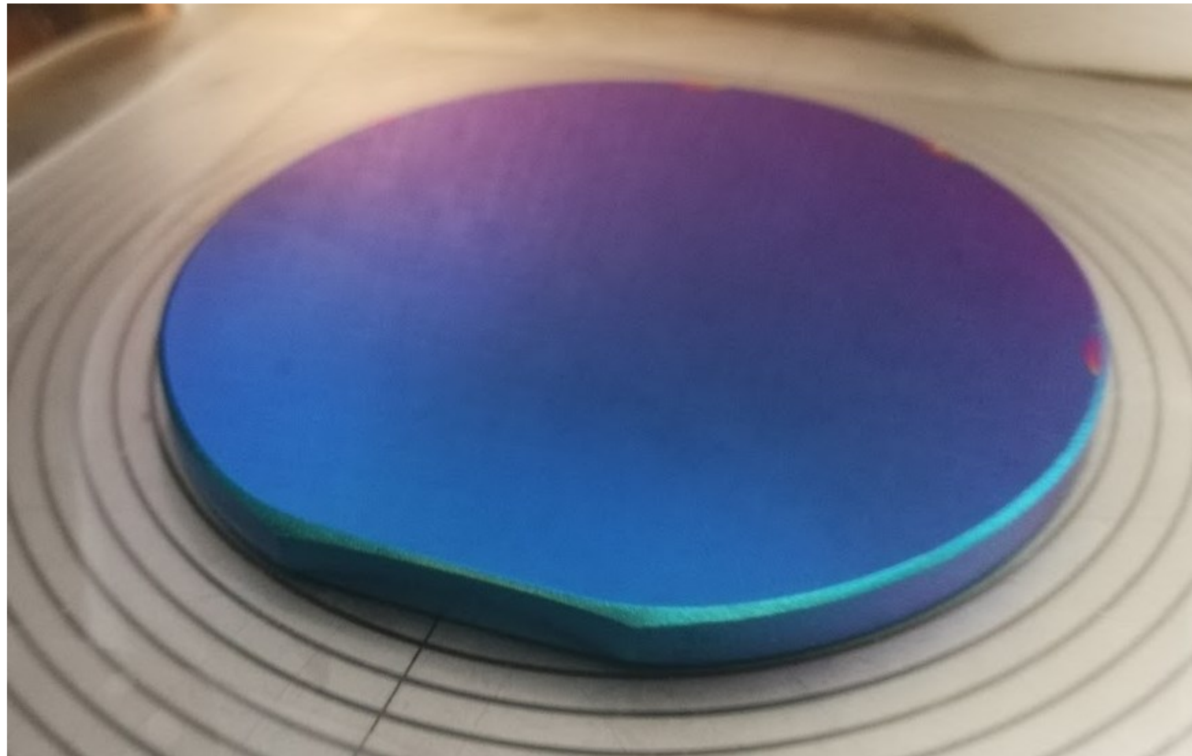
PROCESS



PROCESS

- Wafers coating with silicon nitride (@ Rogue Valley Microdevices)
- Silicon nitride acts as masking agent against chemical etching, preserving the surfaces of the wafer later used for deposition of thin films



Dicing of crystals

BULLKIDs are diced from a commercially available wafer using a fine-grit blade to minimize the mechanical damage during the cut.

Dicing machine

- Cut centre positioning precision: ±0.01 mm
- Cut direction precision: ±0.01°
- Cut depth precision: ±0.005 mm
- Minimal cut width: 0.08 mm
- Maximum cut width: 1 mm
- Maximum cut depth: 5 mm
- Materials: Semiconductors (Si, Ge, SiC, GaAS..) and crystals in general, glass, ceramics

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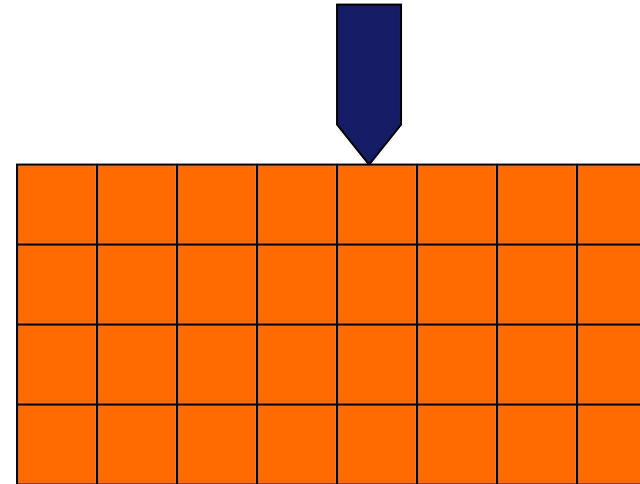

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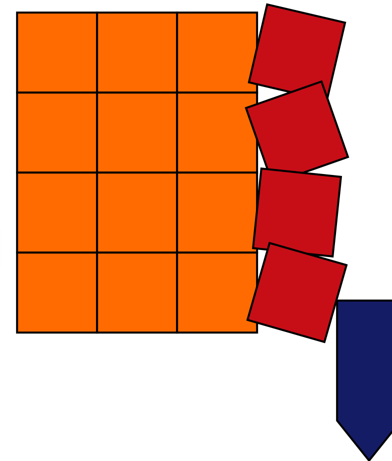
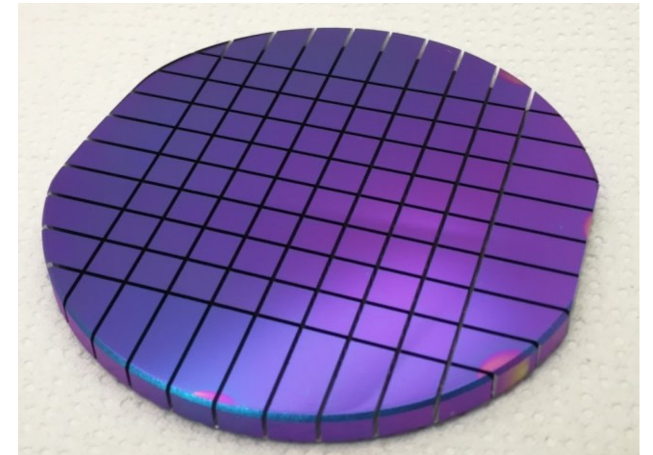




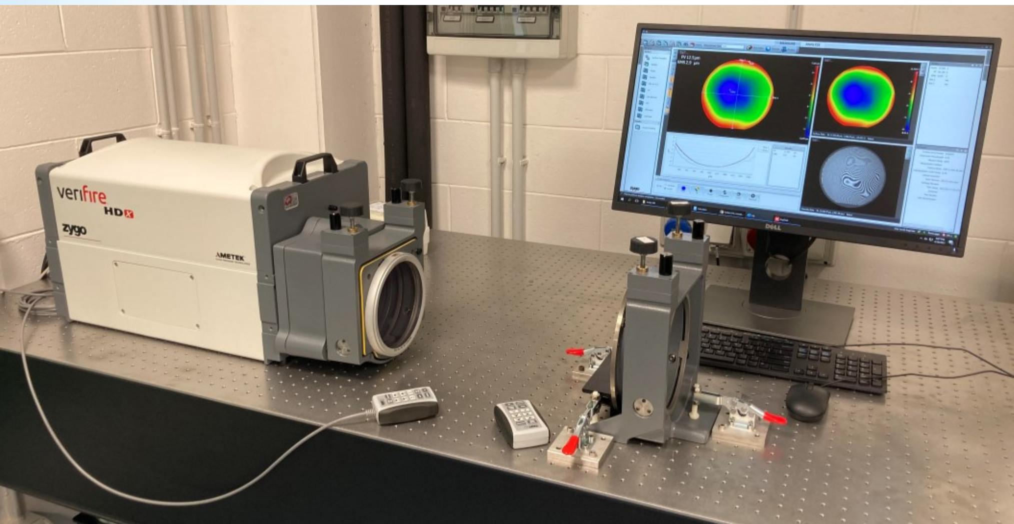
damage is generated at surface,
which can obstruct the final performance
of the BULLKIDs

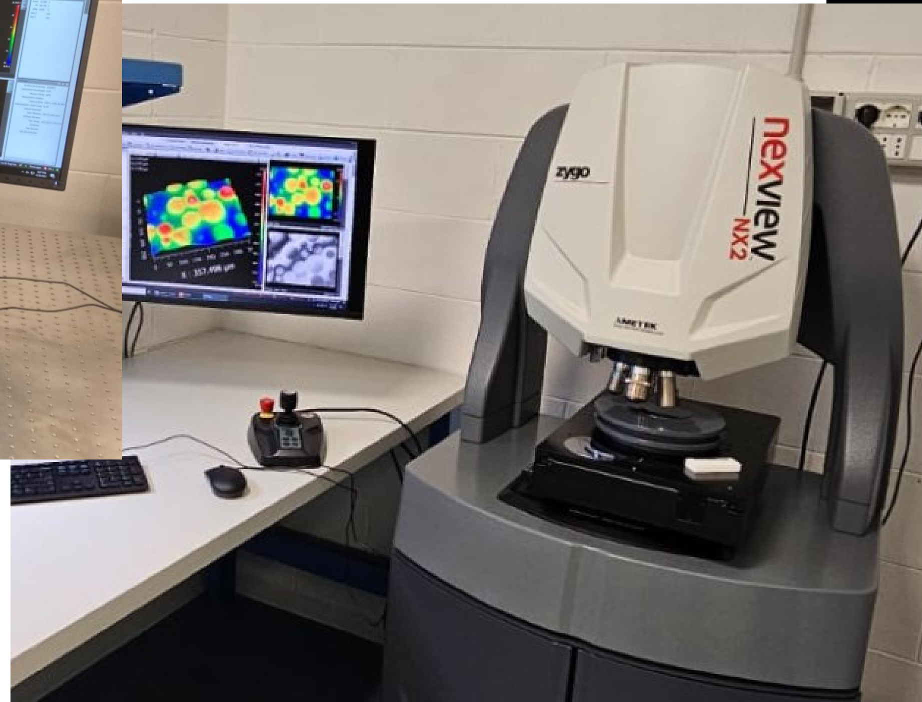
IR interferometry

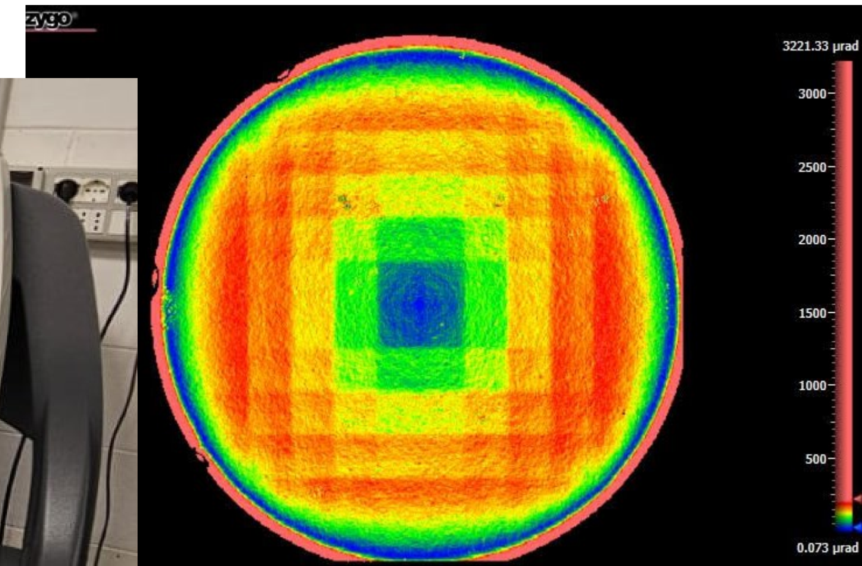
- IR interferometry used to measure thickness of common frame.
- Measurement is carried before and after chemical etching to assure proper removal of silicon.
- Precision can reach sub-micrometer resolution on thin samples (<1mm) and ≈1μm in thicker samples

Laser interferomety

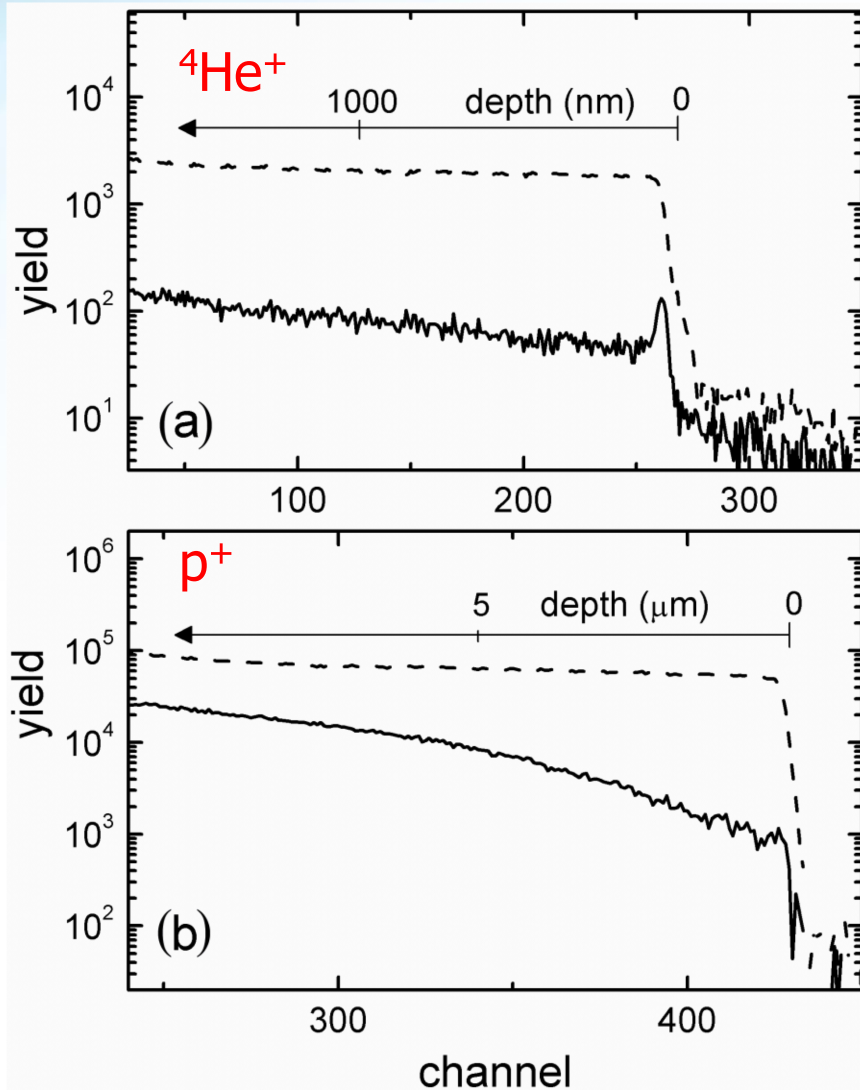
- Optical interferometry is a well-assesed method to characterize flatness of reflective surfaces.
- Used to characherize stress state before and after the chemical etching.
- Characterization performed before and after chemical etching to assure complete removal of the stressed and damaged regions.







CHEMICAL ETCHING



Chemical etching is used to remove lattice damaged regions.

Low signal of backscattered particles means good crystalline quality

S. Baricordi et al., APL 91 (2007) 061908

BULLKID2

Silicon nitride is removed in hot H_3PO_4, leaving final BULLKID2 wafers