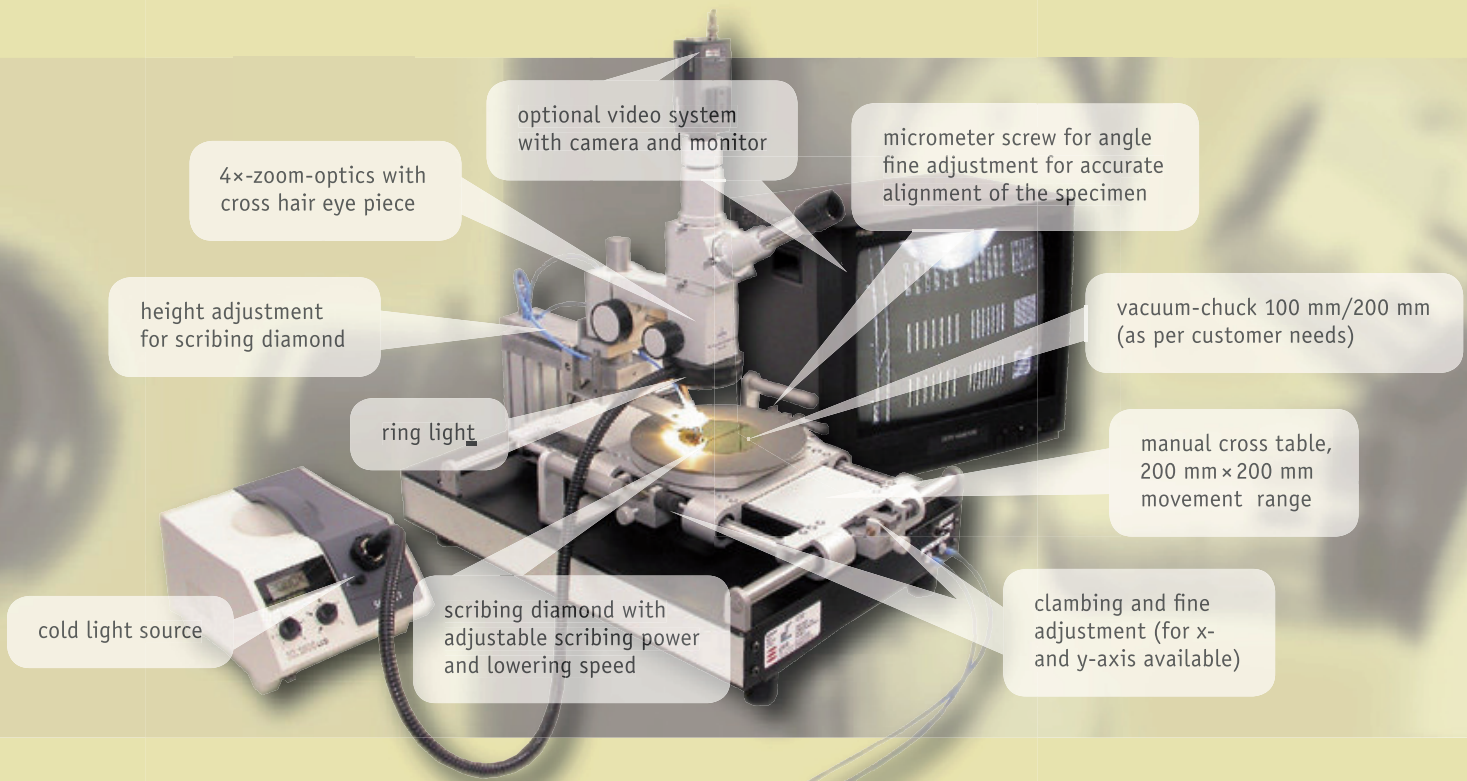


# OptoPhase

## Precision micro diamond scriber MR 200 for manual scribing and cutting of structured silicon wafers

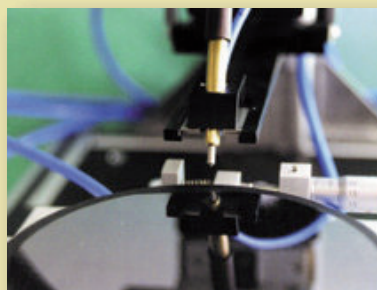


### MR 200 – the ideal tool for REM-preparations in semiconductor technology

The structure and the equipment of the MR 200 make the highly exact cutting and breaking possible of structured silicon wafers. Particularly for REM-preparations within the semiconductor technology the MR 200 is an indispensable aid. The use for the sort of chips is possible for small numbers of items particularly in the laboratory range likewise.

### Ultra accurate cutting, simple handling

After positioning the substrate (or a piece of the wafer, minimum size 20 mm x 20 mm) on the wafer chuck the microscope is focused on the wafer surface. By manual driving of the table into y-direction (cutting line) and adjustment both the



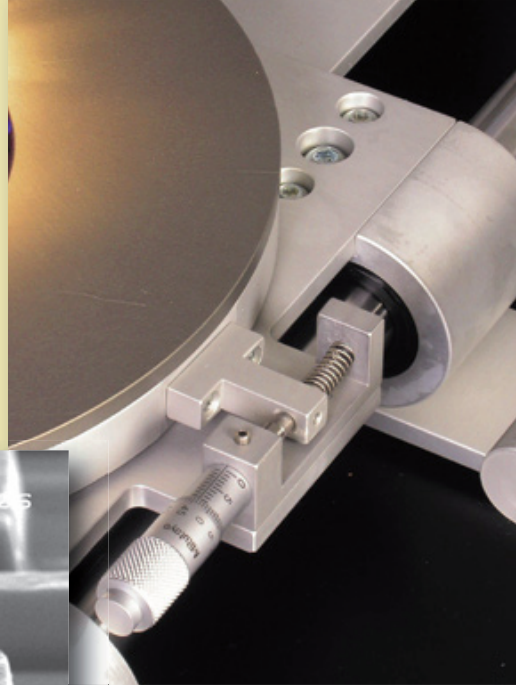
y-line of the hair cross is harmonized to the x-position and the angle position with reference marks or structures.

The high-quality 4x-zoom microscope makes the step less change possible between overview and detail representation on the test specimen surface. With the fine adjustment of the x/y-table the wafer is highly exact positioned. The cutting strength can be adapted to the material which can be cut, as the pressure to the cutting diamond is adjusted by a valve. During the cutting procedure takes place, the sinking or rise of the cutting diamond is controlled by means of foot switches, so that the manual cutting movement with both hands can be steered. The set-up point of the cutting diamond can be adjusted. The eyepiece hair cross should thereby indicate the set-up

point of the cutting diamonds.

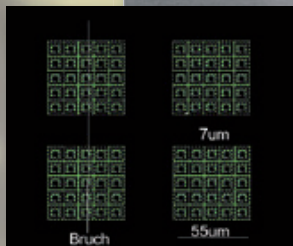
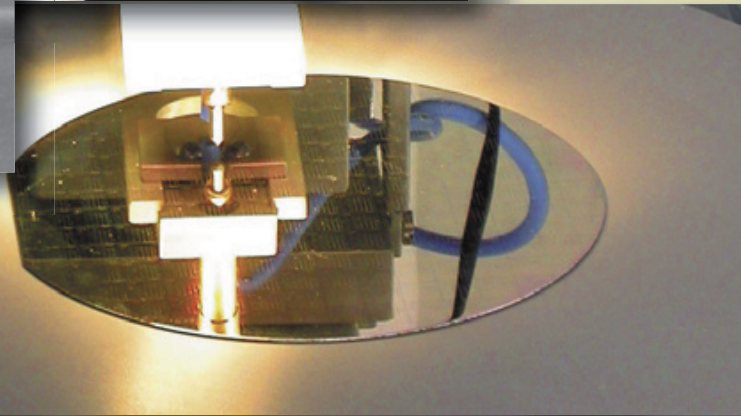
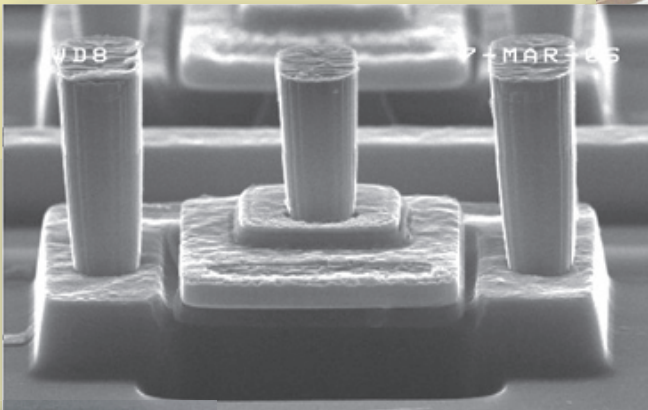
The chuck can be turned with switched on vacuum accurately around 90°, so that exactly running cutting lines can be produced perpendicularly to each other.

If the cutting line is fixed, the cutting diamond is lowered pneumatically by manipulation of the foot switch. For cutting the complete vacuum chuck is shifted by hand. The cutting procedure can be observed in the microscope. According to the materials to be scribed, the cutting strength can be adjusted in a wide range. A video system for the microscope is optionally available, so that the wafer positioning at the monitor can be observed.



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## Pictures:

- 1 angle fine adjustment for accurate definition of scribing and cutting lines
- 2 REM-picture (magnification about 30,000x) of a break through a single transistor with a size of  $7\ \mu\text{m} \times 7\ \mu\text{m}$ . (Source: IHP GmbH Frankfurt (Oder), 2007©)
- 3 array of single transistors, total size  $55\ \mu\text{m} \times 55\ \mu\text{m}$ : The MR 200 makes it possible to cut the wafer with such high precision, that the break runs absolute exactly through a single transistor (size  $7\ \mu\text{m} \times 7\ \mu\text{m}$ ) of the array (Source: IHP GmbH Frankfurt (Oder), 2007©)
- 4 scribing diamond

### Technical parameters

- dimensions appr. 400 mm×800 mm×600 mm (W×D×H)
- weight appr. 20 kg, stable basic frame
- control of the scribing diamond by foot-switch (set down/set up)
- adjustable scribing power (by air pressure valve)
- adjustable lowering speed for scribing diamond
- adjustable height of scribing diamond (for different specimen thicknesses)
- high quality 4x-zoom microscope with step less adjustment of magnification 8x to 40x
- exe piece cross hair for exact adjustment of the scribing line according reference marks, structures, edges or others
- resolution of the optics better  $10\ \mu\text{m}$  at magnification 40x
- vacuum-waferchuck, diameter 100 mm/200 mm with angle-rough-/fine-adjustment ( $10\ \mu\text{m}$  resolution =  $0.006^\circ$ ) on manual x/y-table
- 90°-fixed rotation of wafer chuck
- manual x/y-table, effective stroke (200 mm×200 mm) with 10 mm rough-/fine-positioning by micrometer screw
- maximum scribing distance: 200 mm
- max. 6 bar air pressure necessary (for Si-wafers appr. 1.9 bar used)
- internal vacuum generation by pressure air
- cold light source with ring light, power supply: 220 V
- wafer thickness: all standard thicknesses for Si-wafer
- materials: silicon, sapphire (other materials possible, but not sufficient tested)
- video system/ image processing is available as assembly group
- optics with larger vmagnification/resolution ist available alternatively

## OPTOPHASE

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