Application Note – Wafer Alignment

SILICON WAFER ALIGMENT WITH SWIR CAMERA

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InGaAs cameras are sensitive from 900nm to 1800nm in the Short Wavelength Infra-Red (SWIR) range of the electromagnetic spectrum.

This makes SWIR cameras extremely interesting in the monitoring of wafer bonding process since in the SWIR, pure silicon is transparent at room temperature, while heavily doped silicon becomes more and more opaque as the temperature increases (>200°C).

Imaging wafer plates using modern SWIR cameras such as the OW1.7-CL-320 or OW1.7-CL-640 allows for extremely precise alignment thanks to their high sensitivity, speed, and ease of use.

With the right alignment markings and procedure, accuracies better than 5µm have been achieved using the Raptor Photonics' OW1.7-CL-320.

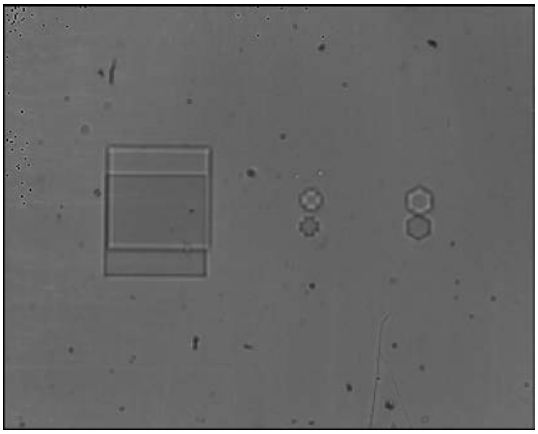

Figure 1: OW1.7-CL-320 wafer alignment 200°C

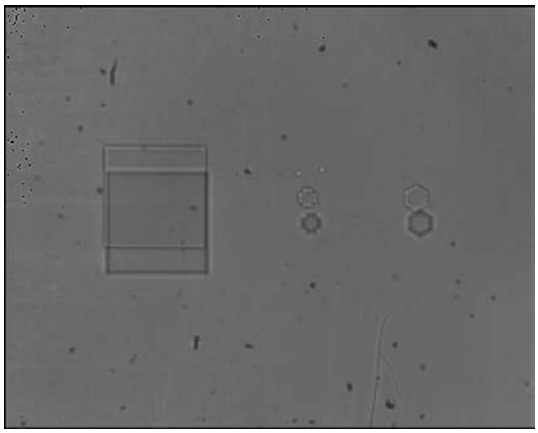

Figure 2: OW1.7-CL-320 wafer alignment 400°C

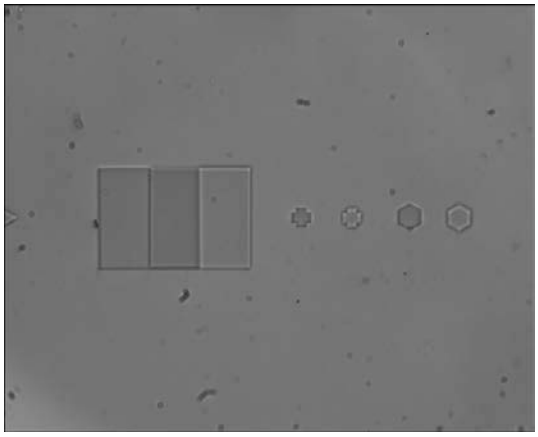

Figure 3: OW1.7-CL-640 alignment

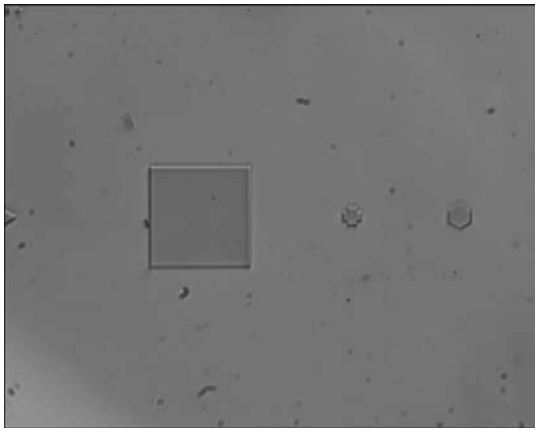

Figure 4: OW1.7-CL-640 aligned

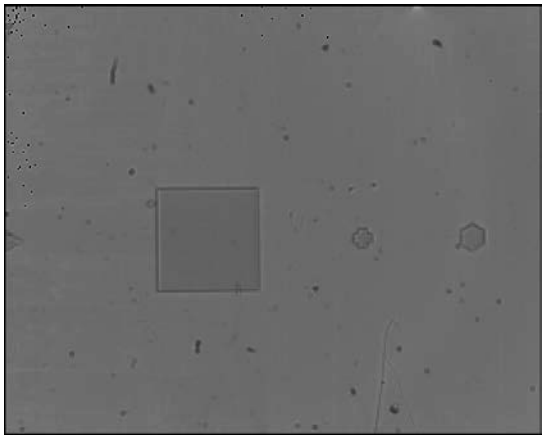

Figure 5: OW1.7-CL-320 wafer aligned

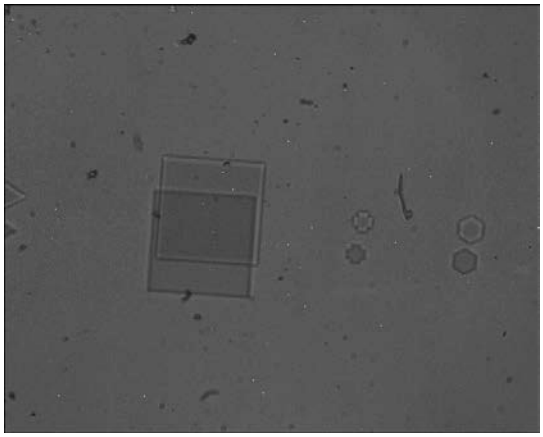

Figure 6: OW1.7-CL-640 Doped 200°C

Figure 7: Owl 320 and 640 InGaAS camera

- **SWIR technology.** Enables high sensitivity imaging from 0.9mm to 1.7mm
- **High quality sensors,** 99% operability, 320x256 30µm or 640x512 15µm
- **Optional Visible extension.** Enables high sensitivity imaging from 0.4mm to 1.7mm
- **14 bit CameraLink output.** Enables high speed digital video with intelligent auto AGC
- **On-board Automated Gain Control (AGC).** Enables clear video in all light conditions
- **On-board intelligent 3 point NUC.** Enables highest quality images
- **Active Image Enhancement.** Further increases the image resolution of the 640x512 sensor
- **Easy control of camera parameters.** Control of Exposure, Gamma and intelligent AGC
- **500ns minimum exposure.** Ideal for active imaging applications
- **Ultra compact,** 50x50x82mm/282g
- **Low power (< 5W).** Ideal for hand-held, mobile or airborne systems
- **Rugged, fanless.** Operation tested up to 2.3 teslas.

About Raptor Photonics

Raptor Photonics Limited is a global leader and manufacturer of high performance, industrial-grade and extremely rugged ultra-low light digital & analogue cameras. Raptor specializes in complete cameras and core engine solutions using CCD, EMCCD, Scientific CMOS and SWIR sensor technology. The extreme low light capability of Raptor's cameras makes them ideal for day/night surveillance, homeland security and scientific markets. Raptor Photonics Ltd is a registered ISO 9001:2008 company and is headquartered in Larne, Northern Ireland.

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