



- 1 Nd:YAG <111> + YAG <111>  
diameter 25 mm, thickness 3 mm.
- 2 Spinell (polycrystalline) + glass (amorphous)  
diameter 25 mm, thickness 9 mm.
- 3 Sapphire <0001> + Sapphire <0001>  
25 x 12 mm<sup>2</sup>, thickness 12 mm.

## HYDROPHILIC BONDING FOR AMORPHOUS AND CRYSTALLINE HEAVY-DUTY OPTICS

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#### Objective

Mineralic bonding technology „at the nanoscale“ for glasses and transparent crystalline materials, ultra-thin and high-temperature adequate for heavy-duty applications.

#### Pre-conditions

- Oxidic materials, in particular with high contents of SiO<sub>2</sub> or Al<sub>2</sub>O<sub>3</sub>
- Extremely smooth (polished) surfaces roughness < 1 nm RMS\*
- Surfaces of high flatness or conform, flatness at least  $\lambda/10$  PV\*

\*  $\lambda$ : wavelength (@ 632 nm)  
PV: peak-to-valley  
RMS: root-mean-square

#### Bond characteristics

- Full transparency (bonding area is “invisible”)
- No uncontrolled creep / drift under mechanical load
- No outgassing at elevated temperatures
- No stress from thermal mismatch at temperature drifts (for identical materials)
- Assembly of individual parts without gap „accurate to gauge blocks“

#### Applications

- UV, VIS and IR-Optics (in transmission and reflection)
- Laser applications (beam guidance, cooling)
- Space applications (extremely stable integrated optics)