



1 *Diamond lenses enable a precise and time stable beam guidance in high power lasers.*

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2 *Molybdenum holder with seven single-crystal diamond samples after growth in the CVD reactor.*

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DIAMOND LENSES FOR HIGH POWER LASERS

For material processing using laser, lenses must meet the high requirements of the beamline to allow for precise marking, cutting or welding of the workpieces. While conventional quartz lenses reach their limits, diamond lenses stay dimensionally stable due to their high thermal conductivity even at extreme temperatures, so that the focal point of the laser beam is not affected. At the Fraunhofer IAF we produce highly pure diamond in a reactor which was specifically developed for this purpose and that facilitates the production of high-power laser lenses.

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Features

- Rapid and parallelized diamond growth:
 - deposition on up to 50 substrates at the same time
 - areas of up to 6 inches
 - stable plasma conditions
- Low material contamination:
 - by nitrogen $<1 \cdot 10^{14}/\text{cm}^3$
 - by boron $<2 \cdot 10^{14}/\text{cm}^3$
- High optical quality with low dislocation density

Applications

- Material processing using laser:
- marking
 - cutting
 - welding