

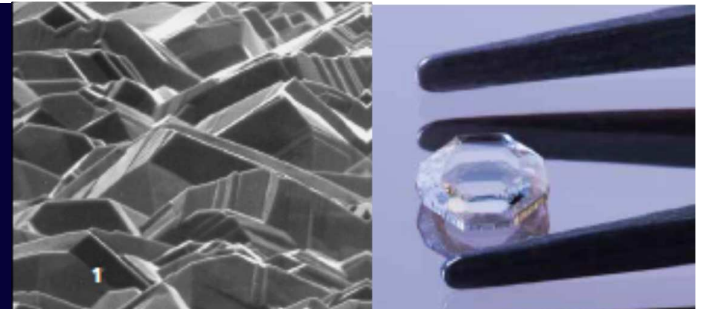
PRODUCT

Lab Grown Diamond Material for Industry

Fraunhofer IAF develops components and devices based on monocrystalline and polycrystalline diamond for use in electronic and optical devices as well as for novel applications in the field of quantum sensors. This includes both the production of high-purity and specifically doped diamond layers using plasma CVD and the development of processes for further processing of the diamond.

LMJ used for:

- Coring for graphite removal around the CVD crystal
- Slicing seeds out of a CVD crystal
- Three-dimensional form cuts



CHALLENGE

Perfect thin and parallel cuts

Main processing criteria:

- Laser cutting of components with high demands on accuracy ($\pm 5 \mu\text{m}$)
- Production of defined facets with a precisely defined slope angle ($\pm 0.1^\circ$)
- 3-dimensional free forms with (almost) any geometry
- Low burn-up, no breakouts, burr-free cut surfaces
- High slope with minimal cutting width
- Minimal wedge formation when cutting

Machining technologies able to reach these criteria:

- Laser MicroJet (LMJ) - water jet guided laser technology



SOLUTION

Perfect parallel Slices, cut of any angle, production-proven process

LMJ advantages:

- very high accurate cut process
- perfect thin and parallel slices
- cut of any angle for 3D free forms using 5-axes movements with highest accuracy
- low roughness of $R_a 0.3 \mu\text{m}$

Installed machine type:

- 1 x DCS 50-5
- 100 W green laser-

