

Laser High Aspect Ratio Drilling Technology Using Tilt Angle Control Optic (Hole Depth: 5 mm or less, Hole Diameter: over 10 μm)

Dr. Jihwan Noh
Department of Laser & Electron Beam Application
T. +82 - 42 - 868 - 7915
E. njw733@kimm.re.kr

- ⇒ Laser machining device for easy control of laser beam focus
- ⇒ Groove machining method for adjustment of tilt angle using laser

Client / Market

- Laser machining device
- Companies with demand for high aspect ratio drilling technology (e.g. engine nozzle manufacturer, etc.)

Necessity of this Technology

- Existing mechanical drilling has an issue of the high strength material easily breaking during drilling.
- Existing laser drilling adjusts the gaussian distribution of the beam strength to control the groove angle.
- In this case, the groove angle cannot be controlled precisely.
- With existing laser drilling, the laser beam or material can be tilted to adjust the angle, but in this case, the large device has to be adjusted, therefore precise angle change in micro units is difficult. Also, with the angle change, the reference point of the device changes, which also changes the focus and decreases the machining precision.
- The price for purchasing Germany's Trepanning laser product is considerably high.

Technical Differentiation

- Overcame the limitations of existing laser drilling
- The side tilt angle of groove can be adjusted through the axial precession using trepanning optics, which allows precise and easy side tilt adjustment.
- By rotating polarized light of laser beam, the processing speed and efficiency is improved.
- Miniaturized optical system
- Can be supplied at a lower price compared to existing trepanning laser products

Excellence of Technology

- Possible to perform high aspect ratio drilling—hole depth less than 5 mm and diameter over 10 μm
- Possible to process grooves in various forms

DESIRED PARTNERSHIP

Technology Transfer

Licensing

Joint Research

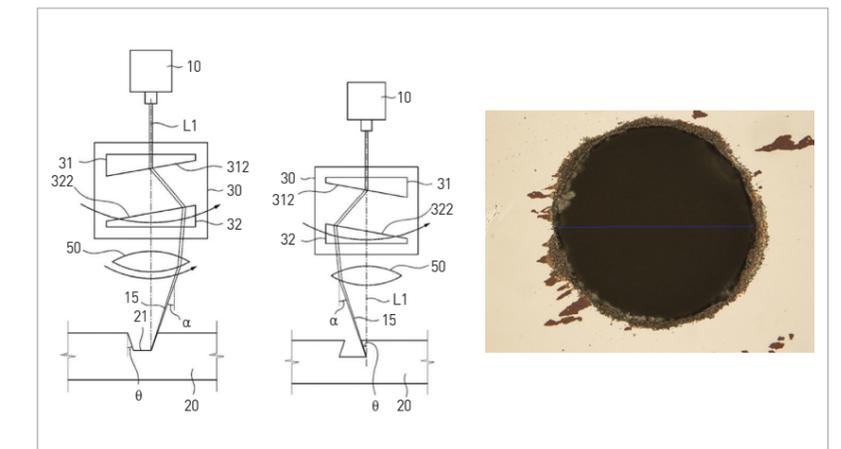
Other



TECHNOLOGY READINESS LEVEL [TRL]

Research, basic explanation | Project concept or idea development | Technology idea verification | Prototype development | Trial product production/evaluation in similar environment | Pilot field demonstration | Development and optimization of commercial model | Commercial product demonstration | Mass production and initial market launch

- Possible to process grooves in a difficult shape that cannot be processed with existing drilling technology
- Possible to easily adjust the groove's side angle



Current Intellectual Property Right Status

PATENT

- Groove Machining Method for Tilt Angle Adjustment Using Laser (KR1269835)