

## Crystals (Standard Laser Gain Media)



SYNOPTICS produces the following crystal materials and has the capability to produce other custom materials upon request.

### Yttrium Aluminum Garnets (YAG)

- Nd:YAG (1064 nm)
- Cr,Tm,Ho:YAG (2080 nm)
- Er:YAG (2940 nm)
- Yb:YAG (1080 nm)
- Cr<sup>4+</sup>:YAG

### Other Oxide Crystals

- Alexandrite (710-800 nm)
- Ruby (694 nm)
- YbGG

### Fluoride Crystals

- Nd:YLF
- Tm:YLF
- Er:YLF
- Ho:YLF

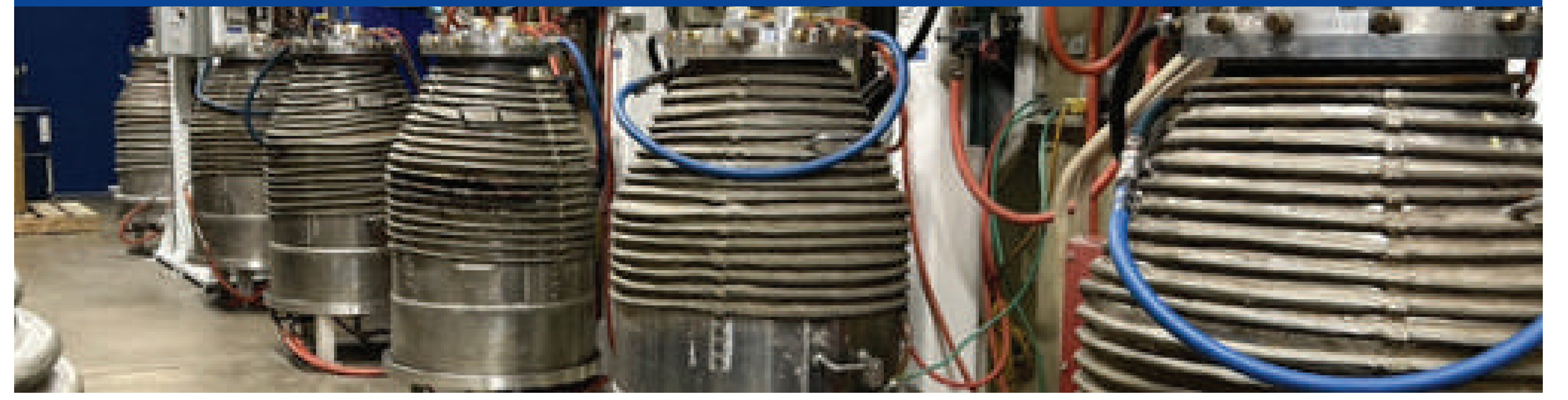
### Gallium Garnets

- GGG
- Er,Cr:YSGG
- Er:YSGG
- Nd, Cr:GSGG

Host crystals (YAG, GGG, YSGG, GSGG, YLF) can be doped with rare earth and transition metals not listed above.

- 532nm
- 780nm
- 755nm
- 1064nm

## Crystal Growth



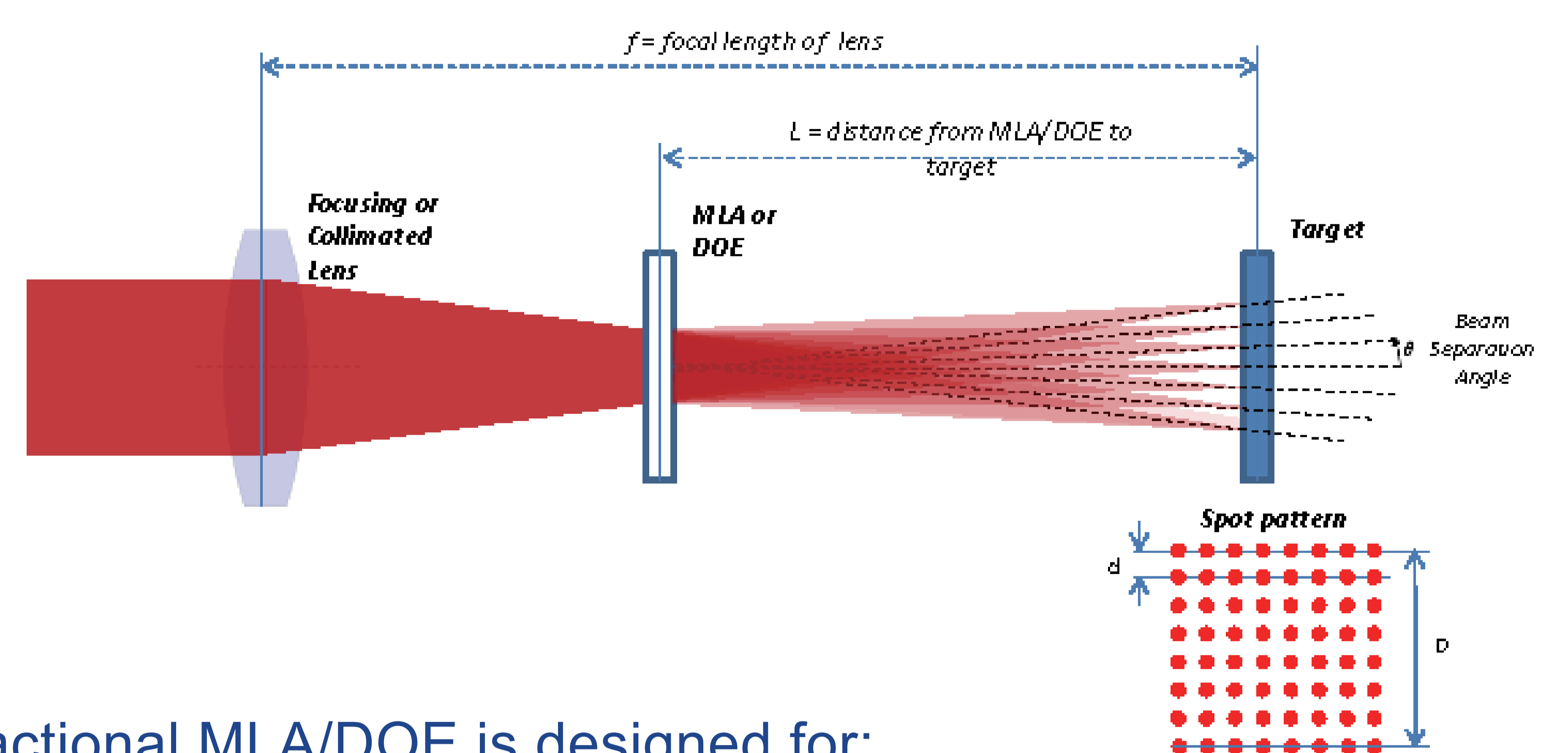
SYNOPTICS is widely recognized as the global leader in the growth of single crystal optical materials.

SYNOPTICS manufactures solid-state laser materials and components for medical, defense, industrial, and Cscientific applications. SYNOPTICS operates more than 100 crystal growth stations utilizing expertise in the Czochralski and specialty solution growth methods to produce a wide variety of crystal materials.

SYNOPTICS welcomes specialty, customer-specific material requests to meet most optical requirements.

- Over 100 crystal growth stations
- Custom Boule growth
- Customer directed dopant concentrations
- Crystal sizes (diameters up to 120 mm and lengths up to 200 mm)

## Fractional Optical Set-up



Fractional MLA/DOE is designed for:

- Specific Wavelength
- Specific Beam Separation Angle
- Specific number of spots

Spot pattern is defined by:

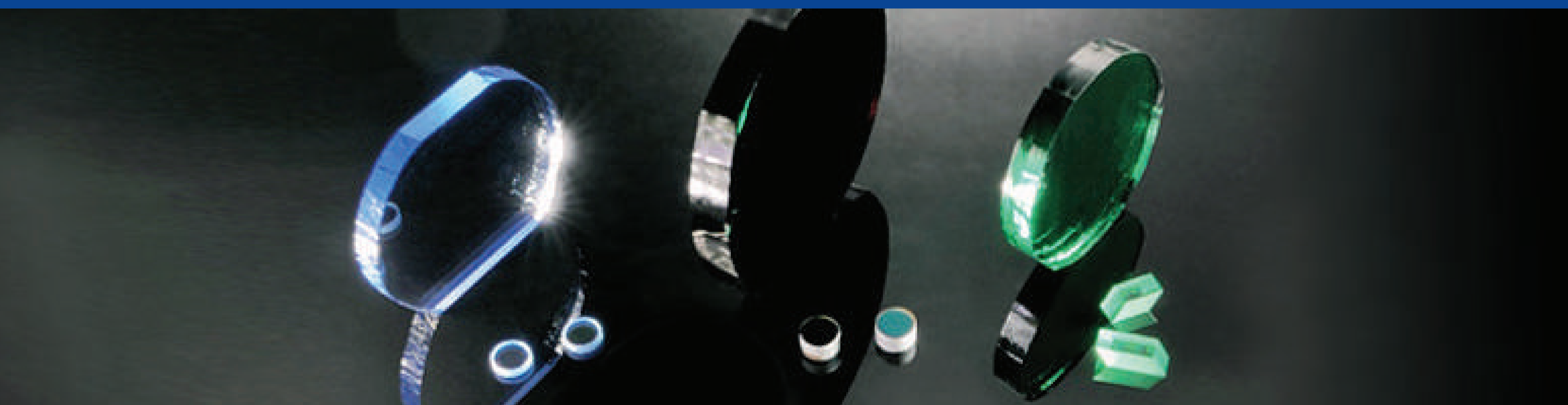
- Beam separation angle of DOE
- Distance from DOE to target
  - $d = \text{distance between spots} = \tan \theta \times L$
  - $D = \text{Total size of pattern} = (N-1) \times d$ , where N is the number of spots in one direction

## Faraday Rotator Devices



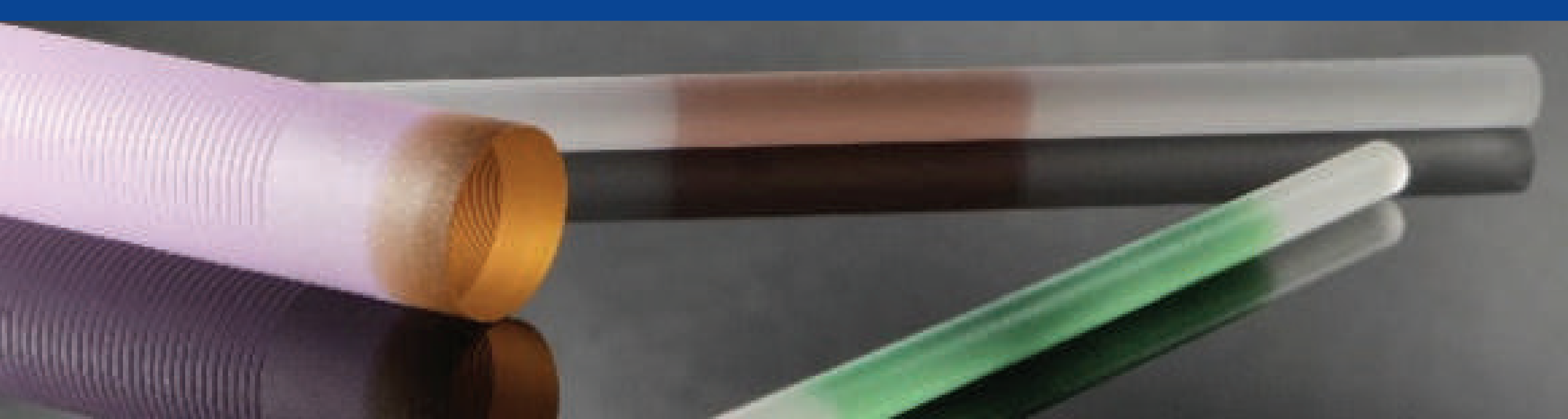
- Customized materials and coatings tailored for each application
- 5 mm, 8 mm, 12 mm standard sizes (600-1300 nm operation)
- Other sizes available upon request

## Passive Q-Switches



- Co:Spinel (1500 nm)
- V<sup>3+</sup>:YAG (1300-1500 nm)
- Cr<sup>4+</sup>:YAG (1064 nm)

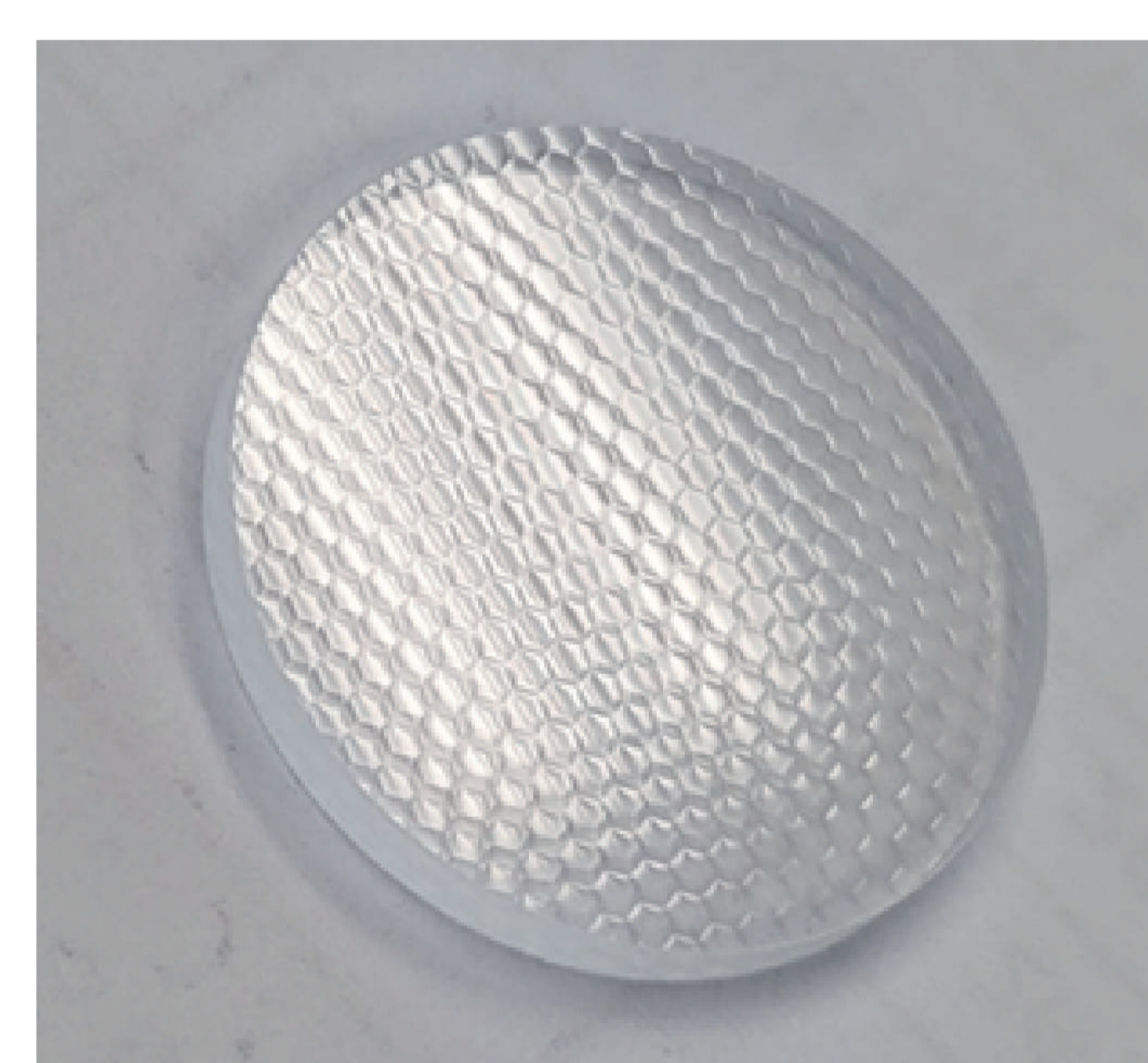
## Other Products/Services



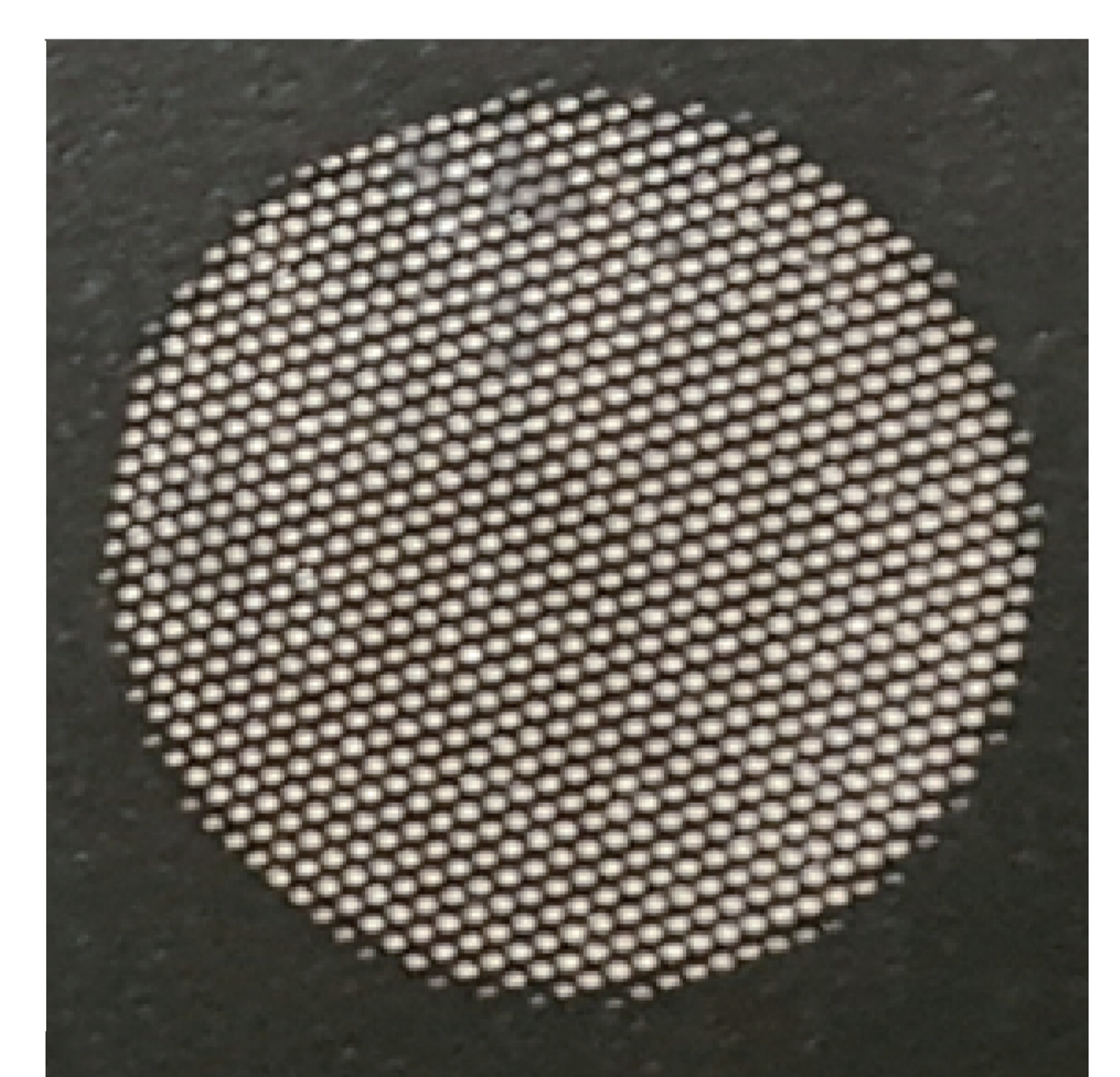
SYNOPTICS offers a wide range of additional services including:

- Extensive re-polish/re-coat services on crystalline and non-crystalline materials
- Diffusion bonding of YAG components
- Optical coatings (non-crystalline materials)

## Fractional Optics MLA, DOE

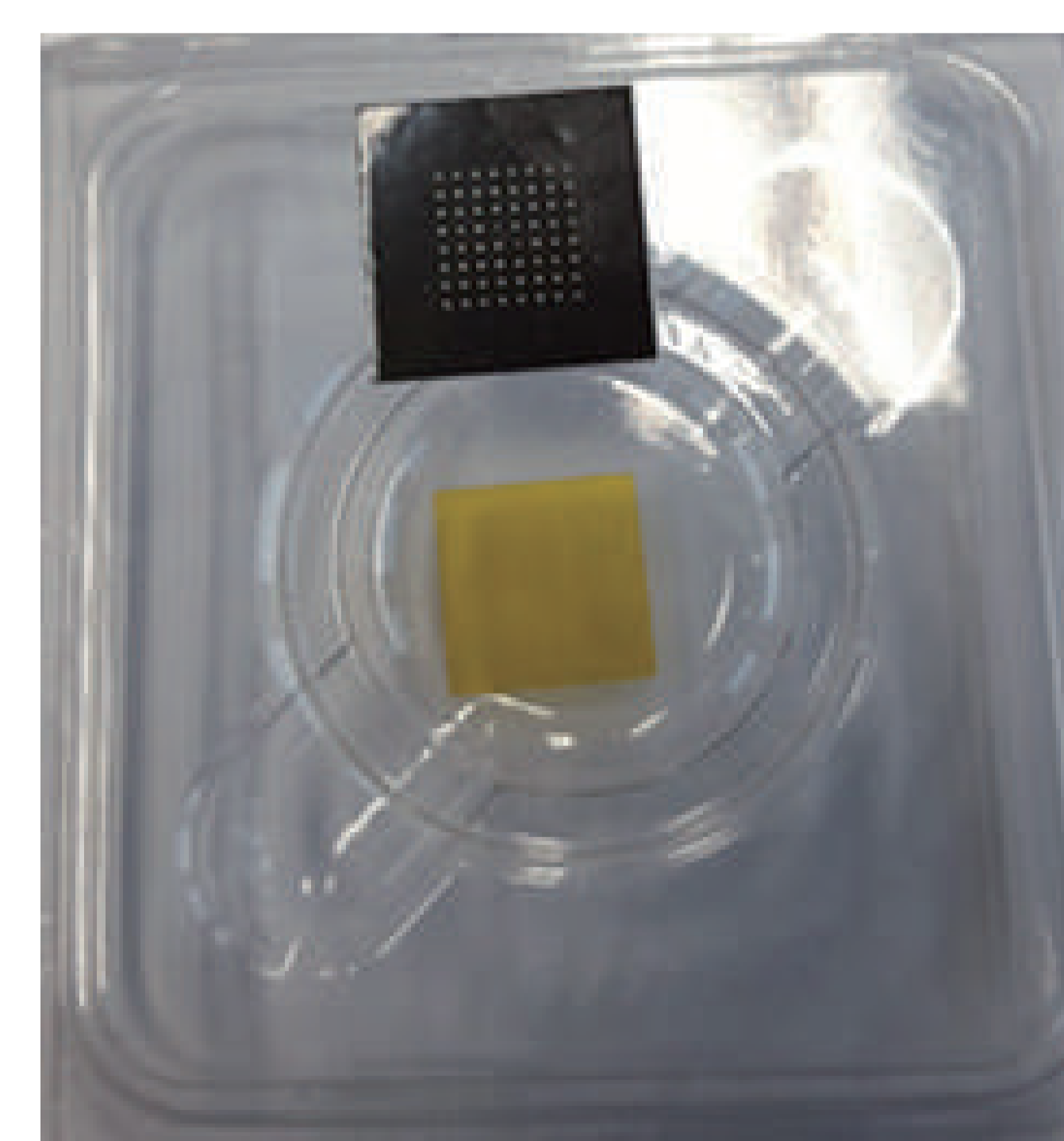


Glass MLA

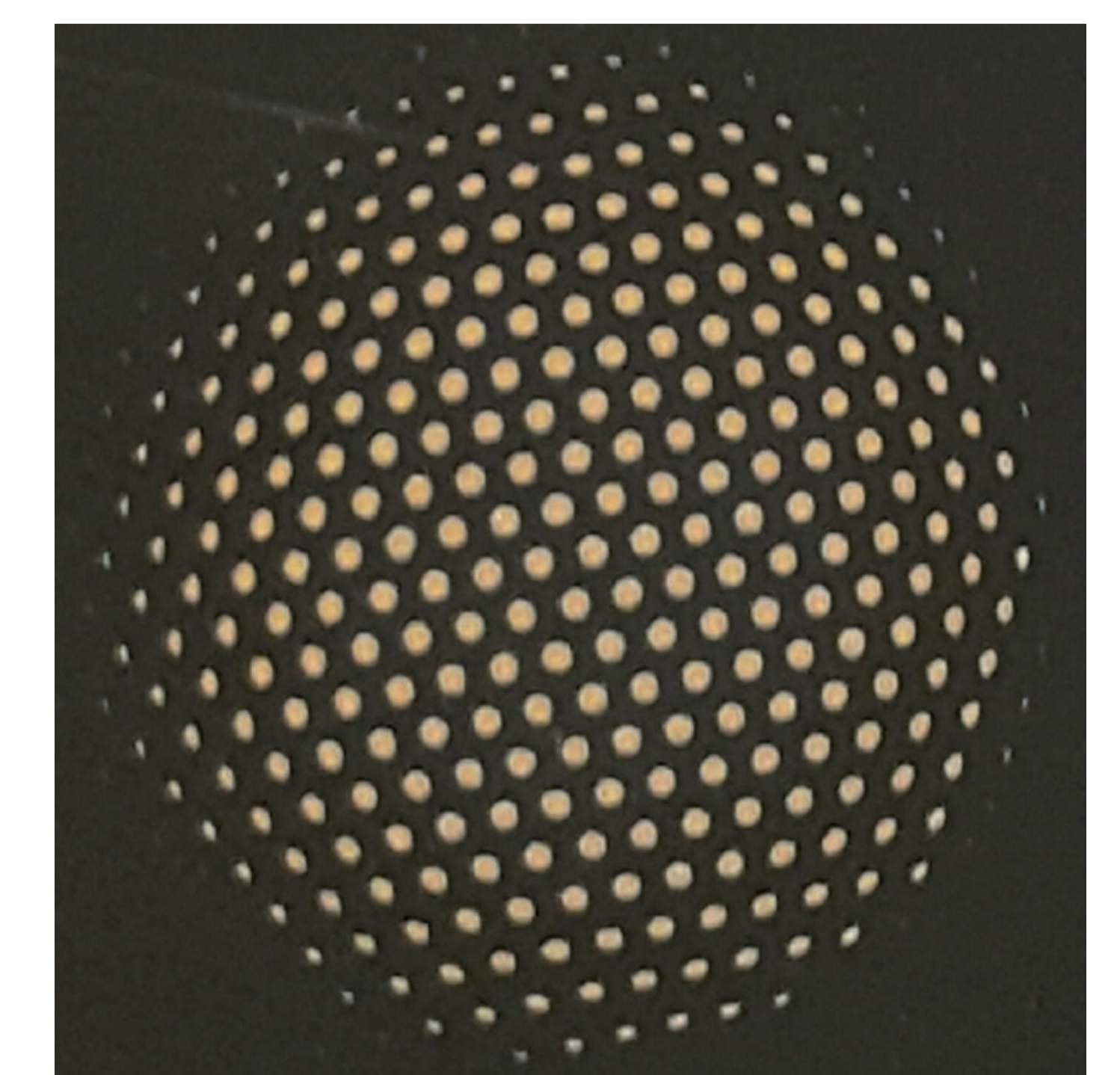


1550nm Coated MLA

- 532nm
- 780nm
- 755nm
- 1064nm
- 2940nm



ZnSe MLA



DOE \_ 10.6um Co2 Laser

532/1064nm Nd:YAG, 755nm Alexandrite, 1550nm Er;Glass, 1950nm Thulium, 2940nm Er:YAG/YSGG, 10600um Co2 laser

Fractional MLA DOE 광학소자는 레이저 파장에 따라 Cell Pitch 와 Spot Size, 재질을 선택함



SYNOPTICS