

## Diffusion Bonding crystals Modules

Diffusion Bonded Crystals Modules (DBM) are crystals consisting of two, three or more parts with different doping levels or different dopant, usually one laser crystal and one or two undoped crystals combined by optical contact and further bonded under high temperature.

ULTI Crystal is a leading manufacturer of finished composite crystal and glass components for solid-state lasers in China. We hold special diffusion bonding technology, which enables the joining of crystal materials without the use of an adhesive or an organic or inorganic bonding aid. This innovative technology reduces thermal lens effect of laser crystals, provides integral components to make compact lasers.

Our diffusion bonding crystals modules allows for the separation of functionalities of laser components into lasing and non-lasing regions, which is critical for high power DPSSL systems. Our module offer a new degree of freedom for the design engineer's realization of rugged, compact, solid state laser systems.

We are support below standard diffusion bonding crystals modules:

### Slab, Disk, Rod diffusion bonding crystals modules

We have product lines of various Slabs, Disks and Rod-based diffusion bonding technology modules.

### Vanadate diffusion bonding crystals modules

Based diffusion bonding technology YVO<sub>4</sub> or GdVO<sub>4</sub> components are extremely useful for higher power in YVO<sub>4</sub>-based laser systems. Undoped end-caps increase damage threshold by separating the pump input face with the lasing doped portion. We produce slabs and rods with plano or spherical end faces.

### Microchip diffusion bonding crystals modules

Based diffusion bonding technology microchips, especially in the form of Nd:YAG/Cr<sup>4+</sup>:YAG passively q-switched microchips have found a host of applications due to their compact size and the incorporation of both the lasing material and q-switch into a monolithic element. This approach minimizes system complexity and system size, and maximizes efficiency.

We have become well known for its ability to produce crystals of larger sizes than previously possible. We are also interested in discussing and manufacturing new material combinations and structural geometries. It is our goal to provide high-quality composites that will provide a solution for your system's needs, so we encourage any design submissions for review. Please contact us for more information and technology supports.

### Diffusion bonding crystals modules Applications

The diffusion bonding crystals modules will have below main applications:

#### Defense and Aerospace

- Missile defense
- Lidar



- Remote Sensing
- Range-Finding
- Countermeasures
- Wind speed measurement
- Cloud and aerosol monitoring

#### **Materials Processing**

- Drilling, cutting, welding
- Marking
- Stereolithography
- Thickness of thin films

#### **Medical Surgery**

- Ophthalmology
- Orthopedics
- Microsurgery
- Aesthetic skin resurfacing
- Hair removal

#### **OEM**

- High Power DPSSL
- OPO Pump
- Ring laser
- Microchip laser
- CD writing

### **Diffusion bonding crystals modules Features**

The diffusion bonding crystals modules will have below main features:

- 1). Elimination of ground state absorption losses of quasi-3-level lasing ions, especially for high power Yb:YAG based rod and slab systems
- 2). Reduction of parasitic oscillations by using diffusion bonding crystals technology.
- 3). Reduction of thermal lensing and other thermal effects with undoped YAG or sapphire acting as heat sink
- 4). Passive q-switching with e.g. Cr<sup>4+</sup>:YAG as integral component of lasing element
- 5). Elimination of spatial hole burning for non-planar ring laser (NPRO) by allowing the reflected beam to traverse through an undoped crystal
- 6). Mechanical support of thin lasing layers, down to about 2-4 μ thickness, thereby also essentially eliminating thermal



effects in this geometry to a negligible level

7). Undoped ends in rods, shaped as straight cylinders or flanges, can function as light ducts for pump radiation

8). Light guiding and wave guiding effects by combining dissimilar compatible materials of different refractive index, e.g. YAG lasing medium with sapphire cladding, YAG with spinel, and GGG with YAG cladding

### Standard Product List

Code	Bonding Material	Finish Size,mm	Shape	End face Configuration	Specs documents	Price
					Download (pdf)	
<b>DMP-101</b>	(YAG)+(Nd:YAG)	5x5x40	Slab	Flat/Flat	the detailed specs	<a href="#">Contact us</a>
<b>DMP-102</b>	(YAG)+(Cr4+:YAG)	9x9x6	Slab	Flat/Flat	the detailed specs	<a href="#">Contact us</a>
<b>DMP-103</b>	(YAG)+(Cr4+:YAG)	2x3x7	Slab	Flat/Flat	the detailed specs	<a href="#">Contact us</a>
<b>DMP-104</b>	(YAG)+(Cr4+:YAG)	5x5x38	Slab	Flat/Flat	the detailed specs	<a href="#">Contact us</a>
<b>DMP-105</b>	(Nd:YAG)+(Cr4+:YAG)	Ø12.7x3.35	Rod	Flat/Flat	the detailed specs	<a href="#">Contact us</a>
<b>DMP-106</b>	(YAG)+(Nd:YAG)+(YAG)	Ø8x164	Rod	Concave/Concave	the detailed specs	<a href="#">Contact us</a>
<b>DMP-107</b>	(YAG)+(Nd:YAG)+(YAG)	Ø4x12	Rod	Flat/Flat	the detailed specs	<a href="#">Contact us</a>
<b>DMP-108</b>	(YAG)+(Nd:YAG)+(Cr4+:YAG)	Ø4.5x40	Rod	Flat/Flat	the detailed specs	<a href="#">Contact us</a>
<b>DMP-109</b>	(YAG)+(Nd:YAG)+(Cr4+:YAG)	5x5x43	Slab	Flat/Flat	the detailed specs	<a href="#">Contact us</a>
<b>DMP-110</b>	(YAG)+(Nd:YAG) +(Cr4+:YAG)+(YAG)	Ø3x6.5	Rod	Concave/flat	the detailed specs	<a href="#">Contact us</a>
<b>DMP-111</b>	(YAG)+(Cr4+:YAG) +(Nd:Ce:YAG)+(YAG)	Ø5x105	Rod	Flat/Flat	the detailed specs	<a href="#">Contact us</a>

### Notes

»| Materials that can be diffusion bonding include common laser host media such as oxides, fluorides, vanadates, crystals as well as glasses. Please contact us to advise your requirement.

»| Custom size is available upon requested.

