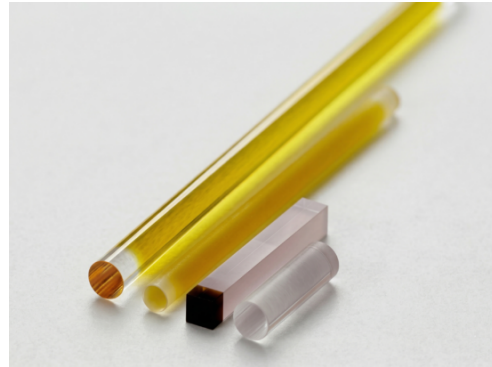


LASER CRYSTALS

Diffusion-Bonded Laser Crystal

Product Brochure & Technical Reference

Diffusion-bonded laser crystal assemblies combine selected crystal segments in one component. Specify the material sequence, doped and undoped lengths, optical faces and coating design.



Reference product image. Shown geometry is illustrative.

Material reference properties / options

Step	Process Description	Engineering Purpose
Surface preparation	Crystal faces are polished and cleaned to support optical contact.	Reduces scattering, gaps, and contamination at the interface.
Optical contact	The parts are brought into close contact before high-temperature bonding.	Forms a low-loss interface before diffusion treatment.
High-temperature bonding	The assembly is heated under controlled conditions, sometimes with pressure depending on process and material.	Promotes diffusion across the interface and strengthens the bond.
Holding period	The assembly is kept at bonding temperature for a defined period.	Allows the interface to stabilize according to the bonding design.
Controlled cooling	The bonded crystal is cooled slowly to room temperature.	Reduces thermal stress, cracking risk, and interface distortion.
Final processing	Cutting, polishing, coating, inspection, and packaging are completed according to drawing.	Ensures the final part matches optical and dimensional requirements.

Reference values and options for selection. Confirm the material grade, geometry, test conditions and acceptance criteria for the quoted configuration.

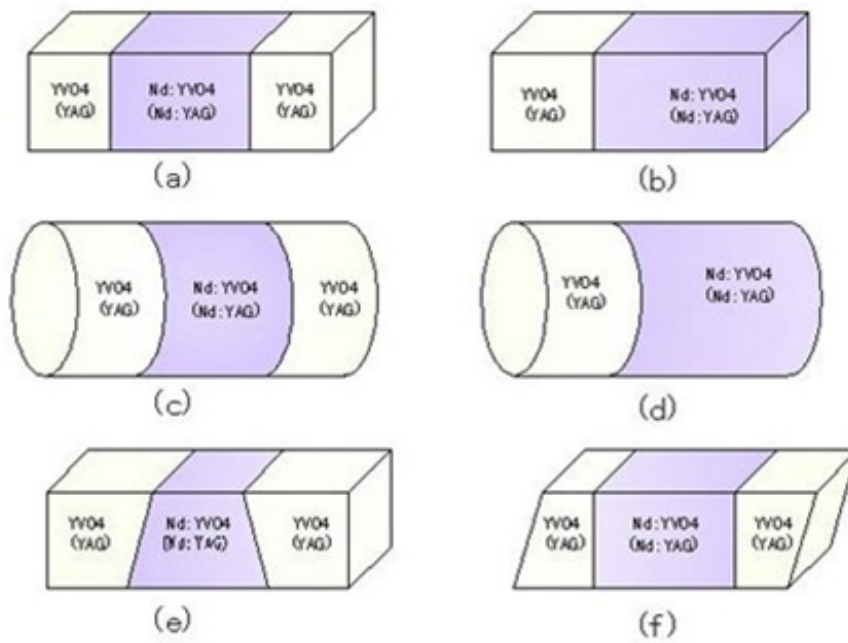
LASER CRYSTALS

Configuration & quotation

Define the component around your application

Application examples: High-power diode-pumped solid-state laser systems; Composite Nd:YAG, Yb:YAG, and Nd:YVO4 laser rods; Thermal lens reduction in end-pumped laser cavities

Bonded crystal structures



Reading the reference

Reference bonded-segment configurations. Doped and undoped materials, segment lengths, clear aperture and optical faces must be defined in the drawing.

Material reference for selection. Confirm final performance and test conditions for the quoted configuration.

Available Diffusion Bonded Crystal Structures

Composite Structure	Typical Function	Design Notes
YAG + Nd:YAG + YAG	Composite Nd:YAG laser rod with undoped end caps	Used to reduce thermal lensing and end-face stress in high-power 1064 nm lasers.
YAG + Nd:YAG + Cr ⁴⁺ :YAG	Gain crystal plus passive Q-switch section	Used for compact passively Q-switched Nd:YAG laser cavities.
YAG + Nd:Ce:YAG + Cr ⁴⁺ :YAG	Co-doped gain crystal with passive Q-switch	Reviewed for pulsed laser designs where Nd:Ce:YAG and Cr:YAG are both required.
YAG + Yb:YAG + Cr ⁴⁺ :YAG	Yb gain crystal with passive Q-switch section	Design depends on cavity gain, wavelength, beam size, and Cr:YAG transmittance.
YVO ₄ + Nd:YVO ₄ + YVO ₄	Composite Nd:YVO ₄ crystal with undoped YVO ₄ sections	Used for compact DPSS laser designs and thermal/interface control.
GdVO ₄ + Nd:GdVO ₄ + GdVO ₄	Composite Nd:GdVO ₄ laser crystal	Can be reviewed when Nd:GdVO ₄ is selected instead of Nd:YVO ₄ or Nd:YAG.
YLF + Nd:YLF + YLF	Composite Nd:YLF laser crystal	Used when Nd:YLF wavelength, polarization, or thermal behavior is preferred.
YLF + Pr:YLF + YLF	Composite Pr:YLF laser crystal	Reviewed for visible laser designs where Pr:YLF is required.
YAG + Ho:YAG + YAG	Composite Ho:YAG laser crystal	Used for around 2.1 um laser systems, depending on pump and cavity design.
YAG + Tm:YAG + YAG	Composite Tm:YAG laser crystal	Used for around 2 um laser systems, depending on doping and cooling design.
Ti:Sapphire + Ti:Sapphire	Custom Ti:Sapphire bonded assembly	Reviewed case by case according to FOM, absorption, aperture, and thermal requirements.
Other custom assemblies	Drawing-defined bonded crystal structure	Material compatibility, thermal expansion, optical interface, and coating feasibility must be reviewed.

Specifications of Diffusion Bonding Laser Crystal

Parameter	Typical Value / Option
Flatness	$\lambda/10$ at 632.8 nm
Wavefront distortion	$\lambda/10$ at 632.8 nm
Surface quality	10/5 per MIL-O-13830A
Parallelism	≤ 10 arcsec
Perpendicularity	≤ 5 arcmin
Bevel / chamfer	< 0.1 mm at 45 degrees
Chips	< 0.1 mm
Clear aperture	$> 95\%$
Coating	AR, HR, or PR coating; IAD, EB, or IBS coating can be reviewed
Quality warranty period	One year under proper use, subject to final sales terms

Prepare your quotation

RFQ Item	Information to Provide
Composite structure	Material sequence, such as YAG + Nd:YAG + YAG or Nd:YAG + Cr:YAG.
Material data	Dopant concentration, Cr:YAG initial transmittance, host material, orientation, and target wavelength.
Geometry	Diameter or square aperture, length of each segment, clear aperture, chamfer, and complete drawing.
Optical specification	Flatness, wavefront distortion, surface quality, parallelism, perpendicularity, and interface requirement.
Coating requirement	AR, HR, PR, pump wavelength coating, laser wavelength coating, or multi-band coating design.
Laser design	Pump source, pump power, output wavelength, pulse format, cooling method, beam size, and cavity layout.
Order information	Prototype quantity, batch quantity, inspection criteria, packaging requirement, and delivery schedule.

Reference values and options for selection. Confirm the material grade, geometry, test conditions and acceptance criteria for the quoted configuration.

Send drawings for engineering review

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