Products & Services

Overview
Standard AFB®
Specialized AFB®
Non-Linear Optics
Lasers
Services

Non-Linear Optics

KTP OPO

Onyx Optics, Inc. introduces Adhesive-Free Bond (AFB®) quasi-non-critical phase-matching (QNCPM) and quasi-phase-matching (QPM) for high efficiency and high beam quality nonlinear optical (NLO) frequency conversion. The AFB® QNCPM and QPM devices have completely compensated for spatial walk-off and enlarged angular acceptance. Similar to non-critical phase-matching (NCPM) devices, they are insensitive to slight laser misalignments, but can be engineered to all critical phase-matching (CPM) wavelengths. The AFB® QNCPM and QPM devices are therefore the ideal replacement for current CPM NLO devices where high efficiency and high beam quality are required.

Onyx Optics, Inc.'s Adhesive-Free Bond (AFB®) technology has primarily been used to produce high efficiency laser composites, such as end-capped laser rods, slabs, disks, and laser waveguides. The scientists at Onyx Optics, Inc. have successfully transferred the AFB® technology to nonlinear optics and demonstrated the AFB® QNCPM and QPM devices in a type-II phase-matched 2-μm KTP OPO. Due to the large walk-off angle (~2.68°) of the e-polarized signal (or idler) beam, the 2-μm OPO's in a single KTP crystal usually require large-scale low repetition rate (several tens Hz) and high pulse energy (several millijoules to several hundreds millijoules) Nd:YAG lasers as a pump source. The AFB® QNCPM and QPM devices developed by Onyx Optics, Inc. each consist of 16 layers of 2mm thick 50°-cut single KTP crystals with walk-off compensated alignment. Nearly 50μJ output has been achieved in the AFB® QNCPM KTP OPO at a pump energy of 523 μJ, a repetition rate of 1 KHz, and a pulse width of 15ns. For the AFB® QPM KTP OPO, two sets of closely spaced signal and idler wavelengths have been achieved with a total output energy of 35 μJ. Both OPO's have measured full-width at half-maximum (FWHM) angular acceptance of 0.35°, which is about nine times broader than the calculated angular acceptance for the same length single KTP OPO.

Walk-Off Correction

Onyx now offers the walk-off correction of non-linear crystals such as KTP and ZGP through our AFB® process. We possess the criteria to design walk-off corrected AFB® composites employing uniaxial and biaxial crystals.

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AFB® Walk-Off Compensated (WoC) Nonlinear Optical Crystal Stack Request Form

* Required field

Name *

Company *

Email *

Phone *

Variables and parameters

Please specify the requested product and result, filling in as much as applicable

Type of Nonlinear Optical Crystal

Pump wavelength (nm)

Target wavelength (nm)

Nonlinear Interaction, e.g. 1064nm (o) + 1064nm (o) → 532nm (e)

Nonlinear Process, e.g. intra-cavity SHG, OPO

Desired Conversion Efficiency

Incident Wavelength(s) on the NLO

Nonlinear Optical Crystal Cut Angle

Single Layer Thickness (mm)

Number of Layers

Total Length = Single Layer Thickness × Number of Layers

Cross section (mm2)

Type of incident beam(s) (CW or Pulsed)

Incident beam 1

If CW: State Power, Beam Size, and Beam quality

If Pulsed: State average power, Rep Rate, Pulse Width, Beam Size, and Beam quality

Incident beam 2

If CW: State Power, Beam size, and Beam quality

If Pulsed: State average power, Rep Rate, Pulse Width, Beam Size, and Beam quality

Specs. for Optical Coating, if any:

700 characters left

Other concerns, please specify:

700 characters left

submit clear