Barium & Strontium tungstate-molybdate – CRYSTALS FOR RAMAN SHIFT

- $Ba(MoO_4)_X(WO_4)_{1-X}$, 0<x<0.01
- $Sr(MoO_4)_X(WO_4)_{1-X}$, 0<x<0.01
- $Sr(MoO_4)_X(WO_4)_{1-X}$, 0.99<x<1

New Barium and Strontium tungstate-molybdate single crystals feature higher Raman gain as compared to KGW or $CaCO_3$ and relatively higher thermal conductivity as compared to a $Ba(NO_2)_3$.

Barium and Strontium tungstate-molybdate single crystals are grown and provided with cut along a-direction. Active elements do not require precise positioning since stimulated Raman scattering (SRS) threshold slightly depends on the crystal orientation relative to pump polarization (within a few percent) and minimum threshold is reached at E||c. In this case, the polarization of the pump and stokes pulses are parallel to the optical axis (c-axis).

The crystals are water-insoluble and durable. Available sizes and shapes of active elements are rectangular up to 10 × 10 × 100 mm or with cylindrical cross-section up to Ø10 × 100 mm.

APPLICATIONS

- Raman converters – new crystals extend the capabilities of the Raman devices in addition to commercially available $Ba(NO_2)_3$, $CaCO_3$, KGW crystals, since new crystals have different values of the Stokes shift and allow to obtain a laser radiation at the other wavelengths
- Raman lasers including self-Raman generation
- Laser pulse compressors based on stimulated Raman scattering effect

RAMAN WAVELENGTHS GENERATION IN BARIUM TUNGSTATE, STRONTIUM TUNGSTATE AND STRONTIUM MOLYBDATE SINGLE CRYSTALS

Crystal	Barium tungstate		Strontium tungstate		Strontium molybdate	
Chemical formula	$Ba(MoO_4)_X(WO_4)_{1-X}$ 0 < x < 0.01		$Sr(MoO_4)_X(WO_4)_{1-X}$ 0 < x < 0.01		$Sr(MoO_4)_X(WO_4)_{1-X}$ 0.99 < x < 1	
Oscillation coeficient	925 cm^{-1}		921.5 cm^{-1}		888 cm^{-1}	
Pump	1064 nm	532 nm	1064 nm	532 nm	1064 nm	532 nm
1 Stoke	1180	560	1180	559	1175	558
2 Stoke	1325	590	1324	590	1312	588
3 Stoke	1510	624	1507	624	1485	620
4 Stoke	1755	662	1751	662	1710	656
1 Antistoke	969	507	969	507	972	508

PHYSICAL AND OPTICAL PROPERTIES

Crystal	Barium tungstate	Strontium tungstate	Strontium molybdate
Chemical formula	$Ba(MoO_4)_X(WO_4)_{1-X}$ 0 < x < 0.01	$Sr(MoO_4)_X(WO_4)_{1-X}$ 0 < x < 0.01	$Sr(MoO_4)_X(WO_4)_{1-X}$ 0.99 < x < 1
Crystal structure	Tetragonal, space group $I4_1/a$	Tetragonal, space group $I4_1/a$	Tetragonal, space group $I4_1/a$
Density	6.35 g/cm^3	6.26 g/cm^3	4.65 g/cm^3
Thermal conductivity	2.3 W/m·K	3 W/m·K	4 W/m·K
Transparency range	0.45 – 5.4 µm	0.25 – 5.4 µm	0.25 – 5.4 µm
Refractive index	n_o =1.806, n_e = 1.804 at 1064 nm n_o =1.848, n_e = 1.846 at 532 nm	n_o =1.84, n_e = 1.85 at 1064 nm n_o =1.87, n_e = 1.88 at 532 nm	n_o =1.878, n_e = 1.88 at 1064 nm n_o =1.919, n_e = 1.924 at 532 nm
Stokes shift	925 cm^{-1}	921.5 cm^{-1}	888 cm^{-1}
Steady-state Raman gain at 1064 nm	8.5 cm/GW	5 cm/GW	5.5 cm/GW
Can be supplied Nd doped: Nd^{3+} concentration in the crystal	0 – 0.15 at. % (on Ba site)	0 – 1.5 at. % (on Sr site)	0 – 1.5 at. % (on Sr site)
Surface optical damage threshold (1064 nm, 4.2 ns)	2 GW/cm^2	1.9 GW/cm^2	0.8 GW/cm^2
Mohs hardness	4	4	4

$BaWO_4$ CRYSTALS FOR RAMAN GENERATION, POLISHED, A-CUT

Dimensions, mm	Coating	Catalogue number	Price, EUR
5 × 5 × 20	Uncoated	BaWO-501	1300
5 × 5 × 30	Uncoated	BaWO-502	1700
5 × 5 × 50	Uncoated	BaWO-503	2060