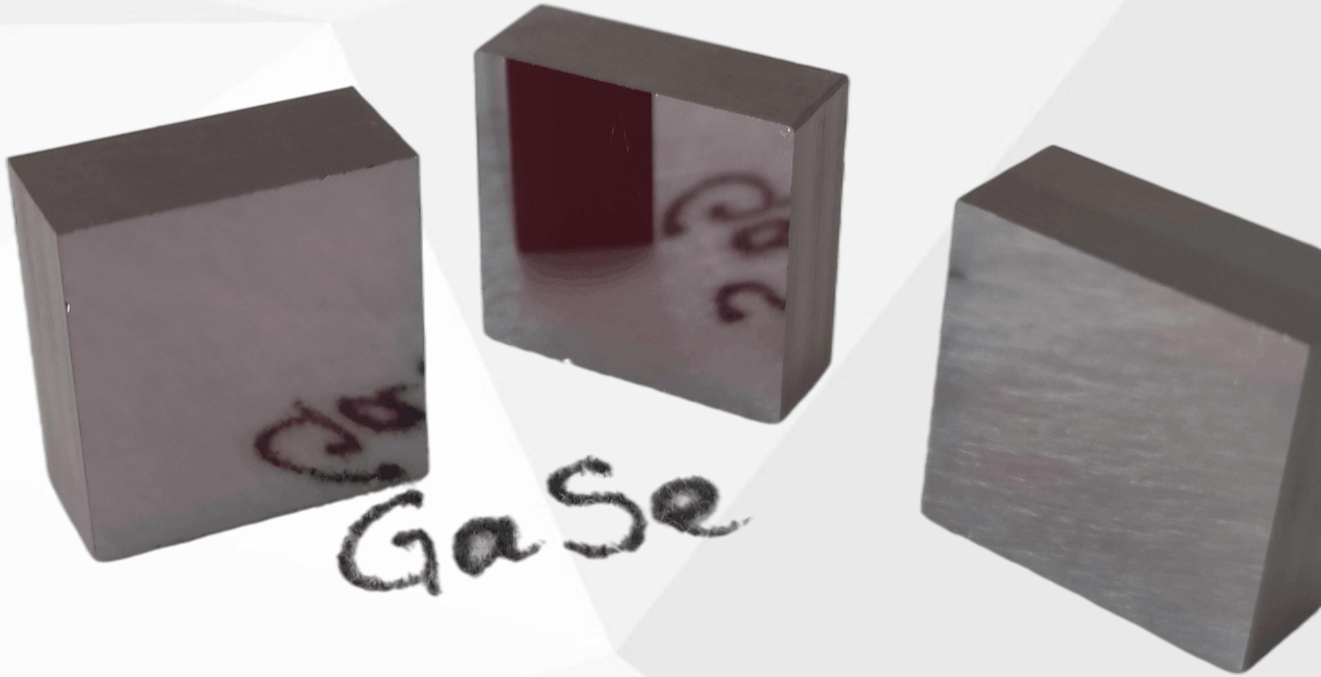
GaSe crystals

Gallium Selenide (GaSe) non-linear optical single crystal, combining a large non-linear coefficient, a high damage threshold and a wide transparency range. It is a is very suitable material for SHG in the mid-IR. The frequency-doubling properties of GaSe were studied in the wavelength range between 6.0 μm and 12.0 μm. GaSe has been successfully used for efficient SHG of CO2 laser (up to 9% conversion); for SHG of pulsed CO, CO2 and chemical DF-laser (l = 2.36 μm) radiation; upconversion of CO and CO2 laser radiation into the visible range; infrared pulses generation via difference frequency mixing of Neodymium and infrared dye laser or (F-)-centre laser pulses; OPG light generation within 3.5–18 μm; terahertz (T-rays) radiation generation. It is impossibile to cut crystals for certain phase matching angles because of material structure (cleave along (001) plane) limiting areas of applications.



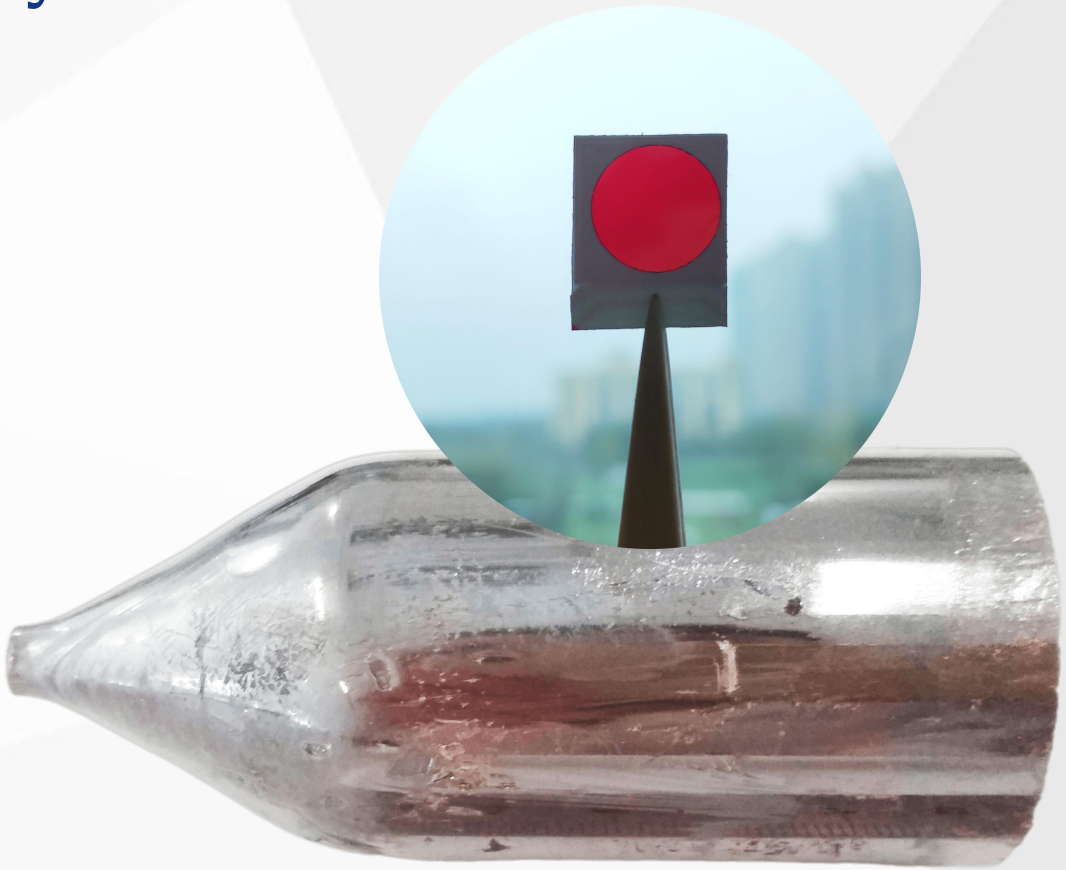
GaSe is very soft and layered crystal. For production of crystal with specified thickness we take thicker starting blank ,For example, 1-2 mm thick and then begin to remove layer by layer trying to approach to ordered thickness while keeping good surface smoothness and flatness. However, for thicknesses about 0.2-0.3 mm or less GaSe plate easily bends and we obtain curved surface instead of flat one.
We usually stay at 0.2 mm thickness for 10x10 mm crystal mounted in in dia.1'' holder with CA opening dia. 9-9.5 mm. Sometimes we accept orders for 0.1 mm crystals, however, we do not guarantee good flatness for so thin crystals.

GaSe crystals

Applications:

- THz (T-rays) radiation generation;
- THz Range: 0.1-4 THz;
- Efficient SHG of CO 2 laser (up to 9% conversion);
- For SHG of pulsed CO, CO2 and chemical DF-laser (l = 2.36 mkm) radiation;
- Upconversion of CO and CO2 laser radiation into the visible range; infrared pulses generation via difference frequency mixing of Neodymium and infrared dye laser or (F-)-centre laser pulses;
- OPG light generation within 3.5 - 18 mkm.

SHG in the mid-IR (CO2, CO, chemical DF-laser etc.)
upconversion of IR laser radiation into the visible range
Parametric generation within 3 – 20 μm
Terahertz THz generation (Del Mar Photonics supply variety of crystals for THz generation, including ZnTe, GaP, LiNbO3 and others)



GaSe crystals

Basic Properties	
Transparency range	μm 0.62 - 20
Point group	6m2
Lattice parameters	a = 3.74, c = 15.89 Å
Density	g/cm3 5.03
Mohs hardness	2
Refractive indexes:	at 5.3 μm no= 2.7233, ne= 2.3966at 10.6 μm no= 2.6975, ne= 2.3745
Non-linear coefficient	pm/V d22 = 54
Walk off	4.1° at 5.3 μm
Optical damage threshold	MW/cm2 28 (9.3 μm, 150 ns); 0.5 (10.6 μm, in CW mode); 30 (1.064 μm, 10 ns)

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