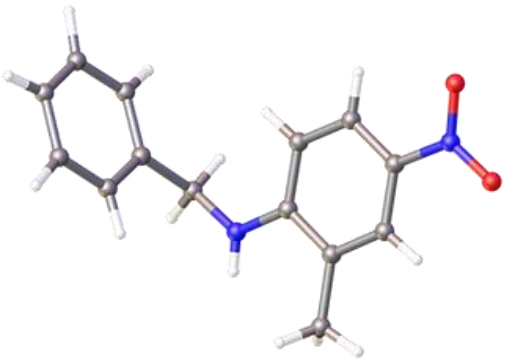
BNA Organic Crystal

N-benzyl-2-methyl-4-nitroaniline

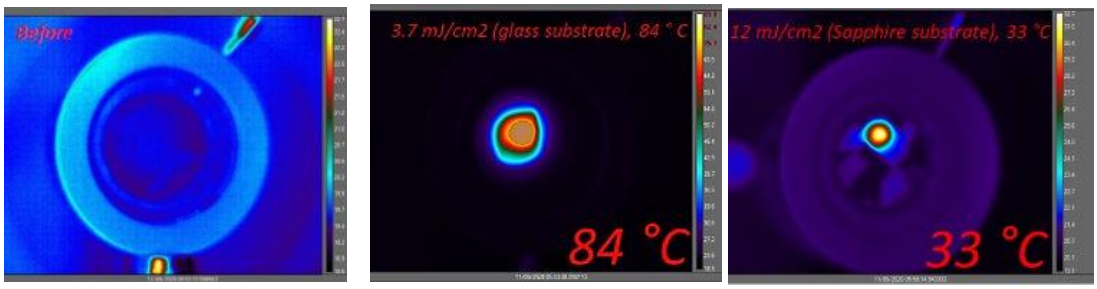


- THz/MIR generator and detector
- Multi-THz generator
- Second harmonic generator

Applications

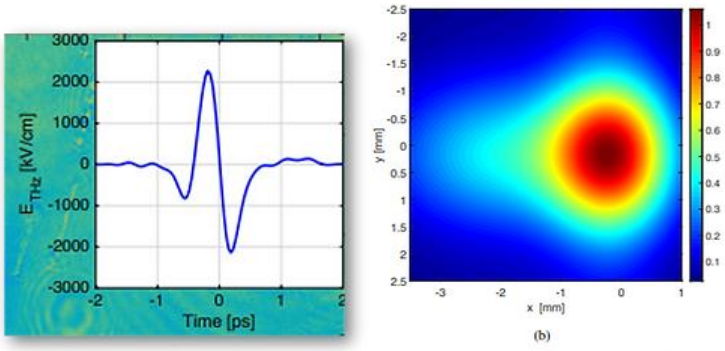
We use our IP-protected Sapphire-BNA technology to overcome the damage of BNA crystals from high power Ti:Sa 800 nm lasers.

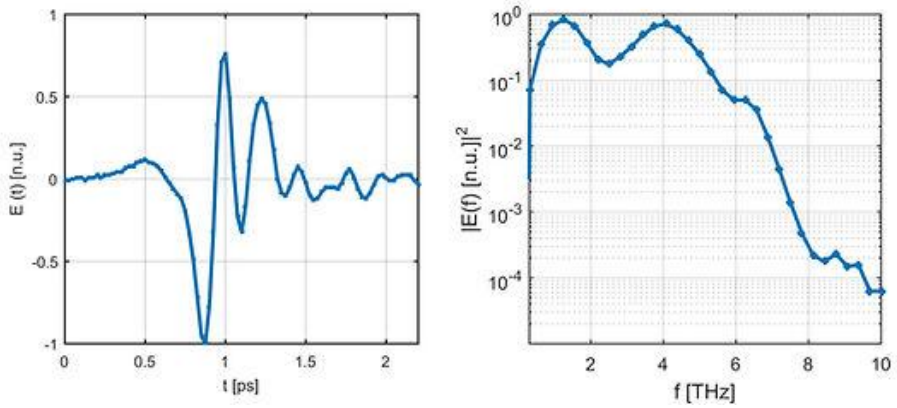
Examples of Sapphire strongly helps in preventing the heating up and melting of the BNA crystal. Images below are thermal images. 2 kHz/ 800 nm. Sapphire-BNA was exposed to 12 mJ/cm2. Glass-BNA was exposed to 3.7 mJ/cm2.



Work done by A. Gopal (Jena Uni, Germany). Idea from Johannes Hasse (PSI, Switzerland).

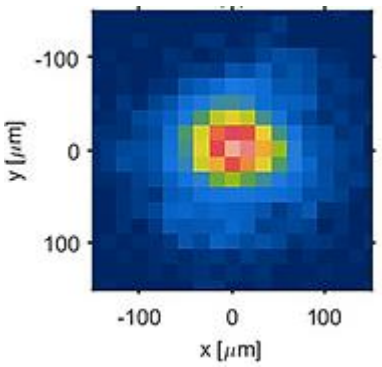
Example Output





Ti:Sa 800 nm: > 4 MV/cm (pp). Smooth Electric field trace. Perfect beam profile. Using old technology (no sapphire). Result by A. Gopal (Jena, Germany). Accepted to Opt. Express.

OPA 1250 nm: > 6 MV/cm (pp). Super broad spectrum. 0.8% efficiency. Perfect beam profile. Diffraction limited focusing using our RIGI microbolometer camera.



Applied Physics Letters ARTICLE scitation.org/journal/apl

Efficient broadband terahertz generation from organic crystal BNA using near infrared pump

Laser Requirements

DSTMS operates with all conventional types of lasers

- Ti:Sa 800 nm
- OPA/ OPCPA
- 1030 nm laser

Expected Output

- Input laser: 1 mJ Ti:Sa 800 nm
- Output THz: 1 MV/cm, 2.1 µJ

Application 1: Intense Nonlinear Spectroscopy

Comparison with conventional ZnTe sources:

Crystal	Conversion Efficiency at RT	Bandwidth
BNA	**0.25%**	**3 THz or 9 THz**
ZnTe	**0.0031%**	**3 THz**

Application 2: Broadband Linear Spectroscopy

Comparison with conventional Lithium Niobate sources:

Crystal	Nonlinear Coefficient	Phase Matching with Ti:Sa 800 nm	Experimental Requirements	Conversion Efficiency at RT	Bandwidth
BNA	**234pm/V**	**Yes**	**Simple Collinear Scheme**	**0.25%**	**3 THz or 9 THz**
Lithium Niobate	**31.5pm/V**	**No**	**Complex Tilted Pulse Front**	**0.1%**	**1 THz or 3 THz**

Application 3: X-ray Streaking Camera

BNA spectrum provides 5 times better streaking resolution than Lithium Niobate presently employed in all X-ray streaking cameras.

Literature

Opt. Lett. 4, 1777 (2016); APL 98, 091106 (2011); JOSA B 25, B6 (2008);

Opt. Express 15, 13212 (2007); Appl. Phys. Lett. 98, 091106 (2011); Opt. Lett. 33, 252 (2008)