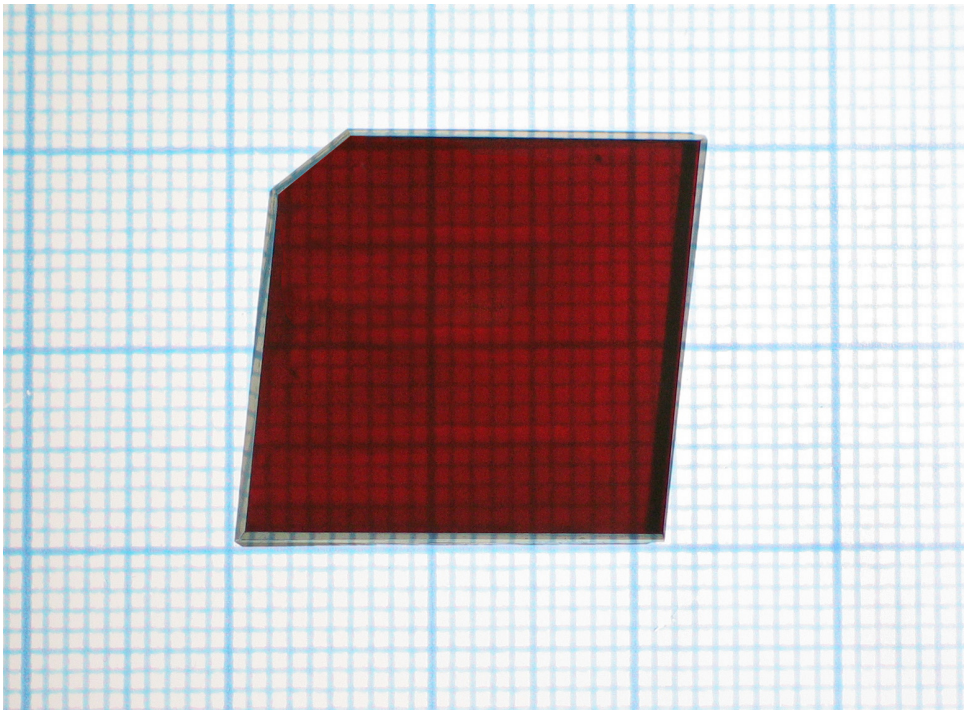
Rainbow Photonics

THz Generation

Electro-Optic DAST Crystals

DAST: 4'-dimethylamino-N-methyl-4-stilbazolium tosylate



Properties

- high quality crystals
- cut and polished for various applications
- large nonlinear optical susceptibilities (d_{11} > 1000pm/V)
- large electro-optic coefficients (r_{11}=92 pm/V)
- phase matching for THz-wave generation between 720 nm and 1650 nm

Applications

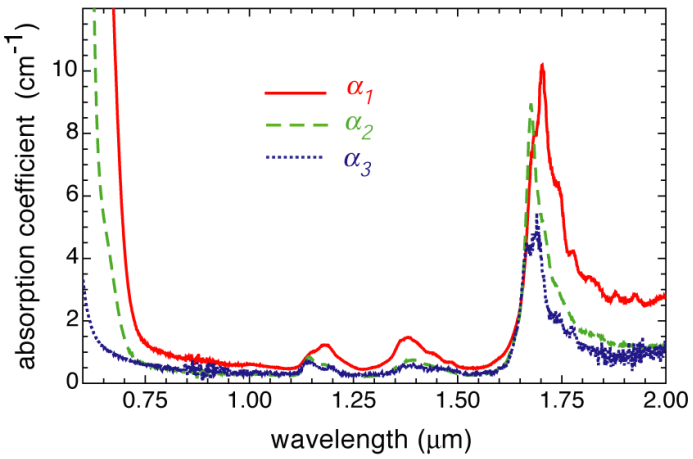
- efficient THz generation and detection from 0.3 to >16 THz
- fast electro-optic modulation
- optical parametric generation
- efficient frequency doubling of 1.55 μm radiation

Physical Properties

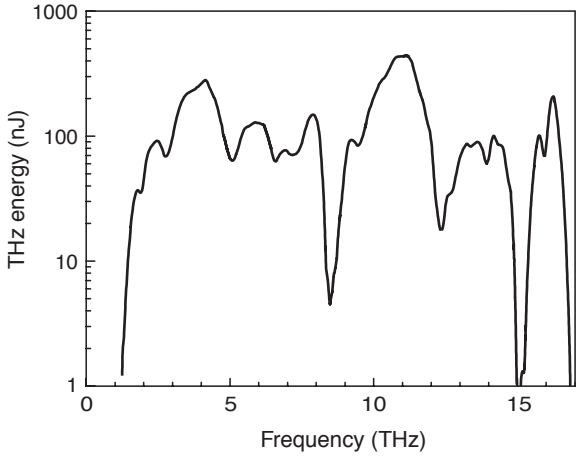
melting point	256 °C		
refractive indices	n_1(720 nm) = 2.519, n_2(720 nm) = 1.720, n_3(720 nm) = 1.635		
nonlinear optical coefficients*	d_{11} (1318 nm)	=	1010 pm/V
	d_{11} (1542 nm)	=	290 pm/V, d_{26}(1542nm) = 39 pm/V
electro optic coefficients	r_{11} (720 nm)	=	92 pm/V
	r_{11} (1313 nm)	=	53 pm/V
	r_{11} (1535 nm)	=	47 pm/V
dielectric constants	ε_1 (3kHz) = 5.2, ε_2 (3kHz) = 4.1, ε_3 (3kHz) = 3.0		

*based on d_{11} = 0.29 pm/V of α-quartz

Absorption Spectrum



THz Generation



1) "Photonic applications with the organic nonlinear optical crystal DAST"; M. Jazbinsek, L. Mutter, P. Gunter, IEEE J. Sel. Top. Quantum Electron. 14,1298 (2008).
2) "Generation of terahertz pulses through optical rectification in organic DAST crystals: Theory and experiment"; A. Schneider, M. Neis, M. Stillhart, B. Ruiz, R. U. A. Khan, and P. Günter, J. Opt. Soc. Am. B 23, 1822 (2006).
3) "High Efficiency Generation and Detection of Terahertz Pulses Using Laser Pulses at Telecommunication Wavelengths"; A. Schneider, M. Stillhart and P. Günter, Opt. Express 14, 5376 (2006).
4) "Strong-field single-cycle THz pulses generated in an organic crystal"; C. P. Hauri, C. Ruchert, C. Vicario, F. Ardana, Appl. Phys. Lett. 99, 161116 (2011).

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