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Title:Highly Efficient Organic THz Generator Pumped at Near-Infrared: Quinolinium Single Crystals
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Abstract:A novel highly efficient ionic electro-optic quinolinium single crystals for THz wave applications is reported. Acentric quinolinium derivatives, HMQ-T (2-(4-hydroxy-3-methoxystyryl)-1-methylquinolinium 4-methylbenzenesulfonate) and HMQ-MBS (2-(4-hydroxy-3-methoxystyryl)-1-methylquinolinium 4-methoxybenzenesulfonate) exhibit high order parameters cos³&thetas;_p = 0.92 and cos³&thetas;_p = 1.0, respectively, as well as a large macroscopic optical nonlinearity, which is in the range of the benchmark stilbazolium DAST (N,N-dimethylamino-N'-methylstilbazolium 4-methylbenzenesulfonate) and phenolic polyene OH1 (2-(3-(4-hydroxystyryl)-5,5-dimethylcyclohex-2-enylidene)malononitrile) crystals. As-grown unpolished bulk HMQ-T crystals with a side length of about 6 mm and thickness of 0.56 mm exhibit 3.1 times higher THz generation efficiency than 0.37 mm thick OH1 crystals and about 8.4 times higher than 1 mm thick inorganic standard ZnTe crystals at the near-infrared fundamental wavelength of 836 nm. Therefore, HMQ crystals with high order parameter obviously have a very high potential for high power THz-wave generation and its applications.
Number of references:34
Inspec controlled terms:optical materials - optical wavelength conversion - organic compounds - terahertz wave generation
Uncontrolled terms:organic terahertz generator - Quinolinium single crystals - ionic electro-optic quinolinium single crystals - acentric quinolinium derivative - inorganic standard crystals - near

infrared fundamental wavelength - size 0.37 mm - wavelength 836 nm

Inspec classification codes:A4265K Optical harmonic generation, frequency conversion, parametric oscillation and amplification - A4270J Optical polymers and other organic optical materials - B4340K Optical harmonic generation, frequency conversion, parametric oscillation and amplification - B4110 Optical materials

Numerical data indexing:size 3.7E-04 m;wavelength 8.36E-07 m

Treatment:Experimental (EXP)

Discipline:Physics (A); Electrical/Electronic engineering (B)

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