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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 cos³θ <inf>p</inf> = 0.92 and cos³θ<inf>p</inf> = 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.
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Controlled terms:Crystal growth - Infrared devices - Nonlinear optics - Phenols - Terahertz waves - Zinc compounds

Uncontrolled terms:As-grown - Fundamental wavelength - High order parameters - High potential - High-power - Malononitriles - Near Infrared - Optical nonlinearity - Organic crystal - Side length - THz generation - THz waves - ZnTe crystal
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