



H

K

(DB)

F . 2 . E DB

36,

B fl

,

-

- (“ ”),

- .

$$n_2 = \frac{3^{(3)}}{2n_0^2 \epsilon_0 c} \quad (4)$$

, ⁽³⁾ - , :

$$n = \frac{3^{(3)}}{4n_0} |E|^2 \quad (5)$$

ν :

$$\frac{c}{\nu} = \frac{2}{M} n_0 + \frac{3^{(3)}}{4n_0} |E|^2 \quad 4$$

(3) = $2.09 \times 10^{-14} \text{ m}^2 \cdot \text{s}^{-2}$,
 . F ,

0.38 H ,

(200–500 J),

2),
 $4.38 \times 10^{-22} \text{ m}^2 \cdot \text{s}^{-2} \cdot \text{C}$,
 K

(
 F .4 , ,
 $40 \text{ } 0.32 \text{ H}$
 $44 \text{ } 0.38 \text{ H}$.
 fi
 :

A , KE , M_1

“ ” ,
 500 ,
 DB 100 ,
 200 , F .4

0.32 H

n

$$P_{NL}(z) = \int_{0^-}^{0^+} \epsilon_0^{(2)}(z; \omega_1, -\omega_1) E_p(\omega_1) E_p^*(\omega_1) dz \quad (12)$$

where $\epsilon_0^{(2)}$ is the second-order nonlinear susceptibility tensor. For a uniaxial crystal, the only non-zero component is $\epsilon_0^{(2)} = \chi^{(2)}$. The nonlinear polarization P_{NL} is then given by $P_{NL} = \epsilon_0 \chi^{(2)} E_p^2$. The nonlinear susceptibility $\chi^{(2)}$ is a third-rank tensor, and its value depends on the crystal orientation and the polarization of the incident light. For a uniaxial crystal, the only non-zero component is $\chi^{(2)} = \chi^{(2)}_{ijk}$, where i, j, k are the indices of the crystal axes. The value of $\chi^{(2)}$ is typically in the range of 10^{-12} to 10^{-10} m/V. The nonlinear polarization P_{NL} is then given by $P_{NL} = \epsilon_0 \chi^{(2)} E_p^2$. The nonlinear susceptibility $\chi^{(2)}$ is a third-rank tensor, and its value depends on the crystal orientation and the polarization of the incident light. For a uniaxial crystal, the only non-zero component is $\chi^{(2)} = \chi^{(2)}_{ijk}$, where i, j, k are the indices of the crystal axes. The value of $\chi^{(2)}$ is typically in the range of 10^{-12} to 10^{-10} m/V.

Detection of THz waves

The detection of THz waves is typically done using a nonlinear crystal. The incident THz wave is converted into a higher frequency wave by the nonlinear crystal. The resulting wave is then detected using a photodetector.

$\phi(x, z)$

where $\phi(x, z)$ is the phase of the THz wave, H is the thickness of the crystal, and $E_{THz}(x, z)$ is the electric field of the THz wave.

$$\phi(x, z) = 2 \frac{h}{p} n(x, z) = 2 \frac{h}{p} \frac{n_e^3 r_{33}}{2} E_H(x, z) \quad (13)$$

where h is Planck's constant, p is the momentum, $n(x, z)$ is the refractive index, and $E_H(x, z)$ is the electric field of the THz wave.

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Conflict of interest

The authors declare no competing interests.

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