

论文

倾斜入射光入射于一维非线性光子晶体中带宽加宽的二次谐波的产生

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摘要:

研究了置于空气中的含缺陷的一维非线性光子晶体中二次谐波的产生.由于反射的二次谐波很强而不能忽略,缓变振幅近似在系统中是不适用的.本文提出了一种不采用缓变振幅近似来处理二次谐波产生问题的方法,并应用这种方法计算相关的二次谐波转换效率.结果表明:随着入射角度的增加,缺陷模对应的波长将变短,并且通过调整基频波入射的角度,可以产生宽带宽并且高转换效率的二次谐波.这个方法适用于任何一维非均匀系统,可以简单方便地计算出二次谐波转换效率.

关键词: 二次谐波产生 准位相匹配 转换效率 带宽

Second Harmonic Generation with Broadened Band Width in One-dimensional Nonlinear Photonic Crystal at the Oblique Incidence of Light

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Abstract:

The one-dimensional nonlinear photonic crystals containing defects that are embedded in air are investigated. However, attributed that the reflective second harmonic wave is so strong that it can not be ignored, the slowly varying amplitude approximation is not applicable to such a system. The paper presents a general solution of second harmonic generation without adopting the slowly varying approximation when the incident light is obliquely launched upon the one-dimensional inhomogeneous systems. The result shows that the wavelenghtes corresponding to the defect modes shift to the short-wavelength with the increasing angle of incidence. The broadened band width second harmonic generation with high conversion efficiency can be achieved by modulating the angle of incidence of fundamental wave. Furthermore, this method can be applicable to any one-dimensional inhomogeneous systems and the conversion efficiency of second harmonic generation can be easily and conveniently calculated.

Keywords: Second Harmonic Generation(SHG); Quasi-phase-matching; Conversion efficiency; Band width

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