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激光材料和光学元件

八角格子色散补偿光纤

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摘要:

为了消除光纤通信系统中色散,采用各向异性完全匹配层和全矢量有限元方法,进行了理论分析和实验验证,设计了一种基于八角格子晶体的同轴双芯色散补偿光子晶体光纤;得到了该色散补偿光纤的传输特性如基模有效折射率、色散、损耗和非线性系数方面的数据,并分析了光纤波导色散与色散补偿光纤结构参量之间的关系。结果表明,所设计的光纤在200nm的负色散范围内,拥有负色散值(在波长为1.55μm处有最低负色散值-1500 ps/(nm • km)),同时在E+S+C波段有较低的限制损耗(小于3.3dB/km);非线性效应也得到显著抑制。

关键词: 光纤光学 光子晶体光纤 有限元法 色散

Octagonal dispersion compensation fiber

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Abstract:

In order to eliminate dispersion in a fiber communication system,based on the finite element method and perfectly matched boundary layers,an octagonal dispersion compensation fiber was proposed. The guiding properties such as fundamental mode,dispersion,confinement loss and nonlinear coefficient were obtained. Besides,it was shown that the negative dispersion over 200nm bandwidth was obtained (the minimum value was -1500ps/(nm • km) at λ=1.55μm). Meanwhile,the fiber exhibited low confinement loss less than 3.3dB/km at 1.55μm in the entire E+S+C band. Also,the nonlinear effect was eliminated effectively because of the low nonlinear coefficient.

Keywords: fiber optics photonics crystal fiber finite element method dispersion

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