

论文

基于光纤光栅谐振腔的掺镱全光纤激光器设计

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摘要:

采用数值分析方法分析了光纤长度、后腔镜反射率等因素对激光器输出阈值泵浦功率、输出功率的影响,为全光纤激光器的优化设计提供了理论基础。在设计过程中采用光纤光栅作为光纤激光器的反馈与选频腔镜,通过锥度光纤实现了泵浦模块与掺镱双包层光纤之间的低损耗连接以及高效率的泵浦激光功率传输,成功研制了具备稳定窄化线宽激光输出的掺镱全光纤激光器。实验得到了波长峰值在1 082.50 nm,谱线宽度0.113 nm,在入纤功率12 w时,泵浦阈值功率0.8 w,斜率效率为70.8%,最大输出功率8.5 w的稳定激光输出。关键词: 光纤光栅; 掺镱双包层光纤; 锥度光纤; 全光纤激光器

关键词: 光纤光栅 掺镱双包层光纤 锥度光纤 全光纤激光器

Design of Yb-doped All-fiber Laser Device Based on Optical Fiber Gratings Resonator

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Abstract:

By means of numerical analysis method, the influences of many factors on output threshold pumped and output powers were analyzed, such as fiber length and back cavity lens reflectivity. These results provide theoretical foundation for optimized design of all-fiber laser device. Yb-doped all-fiber laser device with stable narrowed spectral linewidth laser output was made successfully, using fiber gratings as feedback and frequency-selected cavity lens. Tapered fiber realizes low-loss connection between pumped module and Yb-doped double cladding fiber, and high effective pumped laser output power transmission. The stable laser output can be gained in this test, of which the wavelength is 1 082.50 nm, spectrometric width is 0.113 nm, the largest stable laser output power is 8.5 W, pumped threshold power is 0.8 W, and slope effectivity is 70.8%.

Keywords: Optical fiber gratings Yb-doped double cladding fiber Tapered fiber All-fiber laser device

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