

高Q平面环形微腔二氧化碳激光熔融分析

作者: 贾鹏飞, 闫树斌, 郭涛, 刘俊, 熊继军

单位: 山西省太原市中北大学

基金项目: 973国家重点基础研究发展计划 (no.2009CB326206), 国家自然科学基金 (no.60707014)

摘要:

高Q值的光学微腔, 近年来受到广泛的关注。由于其极高的品质因素和WGM模式, 被广泛的应用于低阈值激光, 微腔量子动力学, 微腔生化传感器等领域。本文采用MEMS工艺制备平面微盘腔, 通过建立物理模型和温度场分析了微盘腔在激光下的温度分布情况, 通过拉曼频移测试了环形腔的热应力。实验结果表明激光处理表面后的微环腔应力为张力, 而且距离环中心越远应力越大, 最后测试得到微腔品质因素为 4.8×10^5 , 耦合效率在95%以上。

关键词: 光学微腔; 品质因素; 激光处理; 拉曼频移

Analysis of High-Q Optical Microtoroid

Author's Name:

Institution:

Abstract:

Recently high-Q optical cavity has been widely researched. As the microcavity inherited the high optical quality and WG mode, it was popular in low threshold laser, electrostatics(QED) experiments, nonlinear optics, as well as bio-chemical sensing. In this paper, MEMS technology was used for manufacture microdisk cavity. We designed physical model and analyzed the temperature distribution theoretically. Furthermore, thermal stress of different microtoroids under CO₂ laser has been tested with Raman Spectral Analyzer. The results showed that the further distance from the center of the cavity, the bigger intermolecular tension is. Quality factor of the microtoroidal cavity was also tested by taper evanescent-field coupling. According to the testing results, the average value can be up to 4.8×10^5 and the coupling efficiency is 95%.

Keywords: optical cavity; quality factor; laser process; Raman frequency

投稿时间: 2010-09-22

[查看pdf文件](#)