

论文

基于水、风混合型冷却系统的LD端面泵浦全固态连续绿光激光器

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摘要:

为了简化激光器冷却系统, 减小体积, 降低成本, 设计出一种基于水、风混合型的冷却系统, 具有水冷和风冷的优点, 可以实现稳定的绿光激光输出。采用结构简单、紧凑的平-凹腔设计, 其端镜为平面镜, 输出镜为凹面镜, 曲率半径R=1m, 腔长L=165mm, 获得较稳定的单端泵浦Nd:YVO4腔内倍频KTP连续绿光激光输出。当晶体吸收的泵浦功率为24.3W时, 532nm激光功率达到4.2W, 光-光转换效率达到17.2%。在绿光输出功率为3W的情况下, 观测到的变化范围在2.5%左右, 温度变化范围在0.1°左右。实验结果表明, 该冷却系统能够较好地转移晶体热效应产生的热量, 实现转化效率较高的绿光输出, 有利于实现高功率激光器的微型化。

关键词: LD端面泵浦激光器;Nd:YVO4; KTP

LD end-pumped solid-state CW green laser with air and water hybrid cooling system

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Abstract:

The cooling system based on the water-cooled and air-cooled combination was designed for simplifying the cooling system, reducing the size and lowering the cost. It has the advantages of both water-cooled and air-cooled systems, and can achieve stable green laser output. LD end pumped Nd:YVO4 and KTP green laser with the simple and compact flat-concave cavity design was obtained. When the crystal absorbs the pumping power of 24.3W, the 532nm laser power is 4.2W and light-optical conversion efficiency is 17.2%. The power change range of about 2.5% and the temperature change range of about 0.1° were observed as the green output power was 3W. The experimental results show that the cooling system can effectively transfer the heat produced by the thermal effect of the crystal, and higher conversion efficiency of green light output can be realized. The technology is favorable to the miniaturization of high-power laser.

Keywords: LD end-pumped laser; Nd:YVO4; KTP

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