



### 器件制备及器件物理

#### 808 nm垂直腔面发射激光器阵列的温度特性分析

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**摘要：** 为了研究温度对808 nm InGaAlAs垂直腔面发射激光器（VCSEL）阵列输出特性的影响，通过变温塞耳迈耶尔方程计算了InGaAlAs量子阱VCSEL的温度漂移系数。采用非闭环结构，制备了2×2的808 nm垂直腔面发射激光器阵列，每个单元的出光口径为60 μm。通过热沉温度调节，对不同温度下的阵列激光波长、光功率以及阈值电流进行了测量。在温度为20 ℃、脉宽为50 μs、重复频率为100 Hz的脉冲条件下，阵列的最大输出功率达到56 mW，中心光谱值为808.38 nm，光谱半宽为2.5 nm，连续输出功率达到22 mW。通过变温测试，发现输出功率在50 ℃以上衰减剧烈，阵列的温漂系数为0.055 nm/℃。实验测得的温漂系数与理论值保持一致。

**关键词：** 808 nm 垂直腔面发射激光器 阵列 温漂特性

#### Temperature Characteristic Analysis of 808 nm Vertical Cavity Surface Emitting Laser Arrays

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**Abstract:** In order to study the output characteristics of 808 nm InGaAlAs vertical cavity surface emitting laser (VCSEL) array at different temperature, the InGaAlAs VCSEL temperature shift is calculated under the temperature-dependent Sellmeier equation. 2×2 arrays of 808 nm VCSEL are fabricated with non-closed structure. Each emitter diameter is 60 μm. Lasing wavelength, optical power and the threshold current are measured by changing the temperature of heat sink. The maximum output power reaches 56 mW in the pulse width of 50 μs, and the repetition frequency of 100 Hz at 20 ℃. The central wavelength is 808.38 nm, and the full width at half maximum is 2.5 nm, continuous output power reaches 22 mW, the output power decreases rapidly above 50 ℃, the temperature shift is 0.055 nm/℃. Experimental temperature shift is consistent with the theoretical value.

**Keywords:** 808 nm VCSEL arrays temperature shift

收稿日期 2013-07-12 修回日期 2013-08-16 网络版发布日期

基金项目:

国家自然科学基金 (51172225, 11074247, 61204056, 61106047); 国家自然科学基金重点项目 (90923037) 资助

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