Reasons for High-Temperature Deformation of Laser Diodes

We present herein an overview of the cathodoluminescence analysis of catastrophically degraded high power laser diodes, both single mode and multimode broad emitter lasers.

Summary This chapter starts with a discussion of possible causes leading to a degradation of critical diode laser parameters. It describes the conditions of som.

A computational model for the evaluation of the thermomechanical effects that give rise to the catastrophic optical damage of laser diodes has been devised. The ...

Thermal strain, laser radiation self- absorption, local collapse of the thermal conductivity, and thermal lensing are the mechanisms inducing the defect formation and propagation leading to the device failure.

The QCW laser diode exhibits pronounced transient temperature variations in the active region under high-current operation, thus triggering significant alterations in transparent current ...

In practice, difficulties in laser diode life testing arise from temperature instability, equipment measurement and control instability, equipment reliability, and power failures.

Catastrophic optical degradation (COD) of high power laser diodes is a crucial factor limiting ultra high power lasers. The understanding of the COD process is essential to improve the endurance of the ...

Laser diodes are operated at high injected current densities, which create high-energy electrons and holes, thermal gradients, potential for strain fields, and a high nonradiative recombination rate inside ...

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This report intends to summarize some of the degradation modes and capabilities of typical LEDs and laser diodes currently used in many communication and sensing systems.

High power laser diodes under continuous wave (cw) operation are devices with extremely elevated internal power densities within their active regions. A very high percentage of that power is effectively ...

A computational model for the evaluation of the thermomechanical effects that give rise to the catastrophic optical damage of laser diodes has been devised. The model traces the progressive ...

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Among the limitations known from semiconductor lasers, catastrophic optical damage (COD) is perhaps the most spectacular power-limiting mechanism. Here, absorption and temperature build up in a ...

COD is associated with a localized overheating of the active region of the laser. The COD power threshold decreases with laser aging and is influenced by operational conditions, such as ...

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