

High-Temperature Deformation of Laser Diodes



Overview

Using a thermomechanical model, the local heating at the defect is shown to induce local stress above the yield strength necessary for plastic deformation. Cathodoluminescence images of the facets show the formation of large facet defects. Here, absorption and temperature build up in a positive feedback loop that eventually leads to material destruction. Thus, this is truly an ultimate. 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 converted into light, but over 25% is transformed into heat. The COD is observed as a process in which the active part of the laser. A computational model for the evaluation of the thermomechanical effects that give rise to the catastrophic optical damage of laser diodes has been devised.

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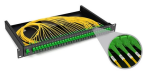
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Local temperatures reached at the front facet defect or inside the cavity can be significantly high, which in a multilayer structure can induce misfits between the layers of different compositions forming the ...



After providing an overview of current research on COD at semiconductor lasers, we present the results of a study on the degradation behavior of 450 nm-emitting GaN-based high-power laser diodes.



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...



Abstract diode - Time-resolved optical and thermal analyses of laser arrays reveals temperature induced chirp and the presence of anomalous hot spots. I. INTRODUCMON ication and rejection of laser ...



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



This study introduces distributed feedback (DFB) laser diode arrays designed to maintain an extensive temperature locking range. We report experimentally on high-power 808 nm DFB laser...

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