808nm GRIN-SCH 양자점 레이저 다이오드 설계

Design of 808nm GRIN-SCH Quantum Dot Laser Diode

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Abstract : The power of semiconductor laser diodes has been limited primarily by the heating effects which occur at high optical intensities. The actual limiting event can take one of a number of forms such as catastrophic optical damage or filamentation. A general approach to this problem is to design a heterostructure which creates a high powered output while maintaining low internal optical intensities.

A graded index separate confinement heterostructure (GRIN-SCH) is one such structure that accomplishes the above task. Here, the active region is sandwiched between graded index layers where the index of refraction increases nearer to the active layer. This structure has been shown to yield a high efficiency due to the confinement of both the optical power and carriers, thereby reducing the optical intensity required to achieve higher powers. The optical confinement also reinforces the optical beam quality against high power effects.

Quantum dots have long been a desirable option for laser diodes due to the enhanced optical properties associated with the zeroth dimensionality. In our work, we use PICS3D software created by Crosslight Software Inc. to simulate the performance of In0.67Al0.33As/Al0.2Ga0.8AsquantumdotsusedwithaGRIN-SCH. The simulation tools are used to optimize the GRIN-SCH structure for high efficiency and optical beam quality.

Key Words : 808nm, InAlAs Quantum Dot, GRIN SCH

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