INFLUENCE OF PARAMETERS OF BARRIER STRATUMS TO A DROP OF A THRESHOLD CURRENT IN INFRA-RED QW LASERS

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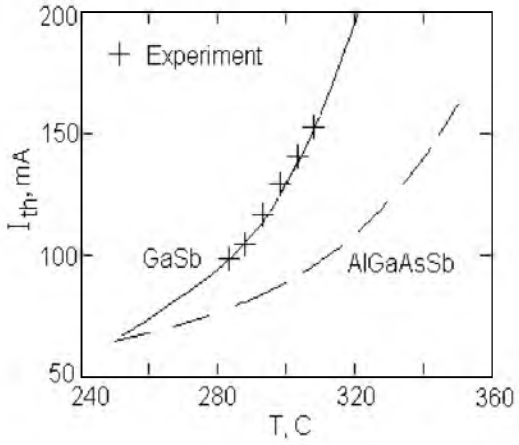
The mid-infrared semiconductor lasers (IR lasers) ($\lambda > 2$ μm) find a use at the analysis of gases in an atmosphere, as a pump source for solid-state lasers, in high definition molecular spectroscopy etc. One of basic working characteristics of such lasers is the dependency of a threshold current from temperature. The negative influence is impacted by a Auger-recombination leading to increasing of a threshold current and its temperature sensitivity (decreasing of a characteristic temperature).

In the given work the dependency of a Auger-recombination factors and threshold current from temperature, structure of barrier layers are theoretically investigated [1]. The material and device characteristics at a various *As* molar fraction and width of QW layer in the strained quantum well heterostructures of a type I based on $In_{(1-x)}Ga_xAs_ySb_{(1-y)}/GaSb$ and $In_{(1-x)}Ga_xAs_ySb_{(1-y)}/Al_{1-x}Ga_xAs_ySb_{1-y}$ was investigated.

The calculation shows that exponential temperature dependence of Auger recombination. Is was shown, that the growth of *Al* mode in barrier layer, which leads to enhancement of an elastic strain level and growth of a band gap width, ensures a drop of Auger-recombination factors. The magnitude of an optimum *As* mode fraction in quantum well and barrier, ensuring a minimum nonradiative recom-bination and threshold current is defined. Thus the drop of a leakage current is marked. This results specifies a possibility to create the mid-IR sources with steady generation in high-temperature area.



1. *Phillips A. F., Sweeney S. J., Adams A. R., Thijs P. J. A.* // J. Select. Topics Quantum Electron. 1999. T.5, № 3. P. 401-411.