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Enhanced Performance of Bipolar Cascade Light Emitting Diodes by Doping the Aluminum Oxide Apertures

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Abstract: Performance improvements in multiple-stage, single-cavity bipolar cascade light emitting diodes including reduced operating voltages, enhanced light generation, and reduced device heating are obtained by doping intracavity **aluminum oxide** apertures with silicon. This doping results in a reduced electron energy barrier and therefore a reduced series resistance which leads to better power and heating characteristics. Nearly 50% reductions in operating voltages, 200% increases in light power, and increased operating range are demonstrated. We discuss the direct implications of these results for the design of bipolar cascade vertical cavity surface emitting lasers.

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