These LDs emitted coherent light at 390–440 nm from an InGaN-based MQW structure under pulsed currents with a duty ratio of 90% at RT. At a low temperature of 233 K, CW operation was achieved with a long lifetime. These results indicate the possibility that the short-wavelength LDs from green to uv will be realized in the near future using III–V-nitride material. As the emission mechanism of these InGaN-based QW LEDs, the recombination of excitons localized at certain potential minima in the InGaN QW was proposed. The laser emissions seem to be a result of the subband transition of quantum-energy levels caused by three-dimensional quantum confinement of electrons and holes localized at certain potential minima, which is equivalent to a quantum-dot energy state.

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