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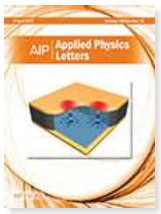

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R. Bachelot, G. Wurtz and P. Royer

Appl. Phys. Lett. **74**, 1347 (1999); https://doi.org/10.1063/1.123547

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Growth and optical characterization of aluminum nitride thin films deposited on silicon by radio-frequency sputtering

Appl. Phys. Lett. **74**, 1209 (1999); https://doi.org/10.1063/1.123501

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A. Boudrioua *and* J. C. Loulergue

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ABSTRACT

Highly textured hexagonal aluminum nitride (AlN) thin films were deposited on silicon substrates by radio-frequency magnetron sputtering at a substrate temperature below 400°C and annealed in the temperature range of 400–450°C by rapid thermal annealing. The optical and the electro-optical properties have been investigated using the prism-coupling technique. Both ordinary and extraordinary refractive indices ($\mathrm{n}_0 = 2.0058$ and $n_e = 2.0374$ at 632.8 nm) were respectively determined from the transverse electric and the transverse magnetic mode excitations. Furthermore, refractive index profiles analysis by using an improved inverse Wentzel–Kramer–Brillouin method reveals a step-like behavior of AlN thin films. The optical losses have been evaluated to be around 7 dB cm^{-1}. The electro-optic coefficient r_{13} of 0.98 pm/V has been measured from the variation of the shift of guided-modes spectrum as a function of the applied electric field in the experiment.

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