Paper SXV-6-93P, International Symposium On Optoelectronic Materia
1993 PAC RIM Meeting, Honolulu

EPITAXIAL THIN FILM AND ION-IMPLANTED WAVEGUIDE LASERS

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We report two methods of producing planar technology waveguides for low threshold laser operation. Ion-implantation can make waveguides in many materials with waveguide laser operation so far observed in YAG, GGG, YAP, $LiNbO_3$, BGO and glass, doped with Nd^{3+}, Yb^{3+}, and Tm^{3+}. 2D and 3D guides have been fabricated and propagation losses as low as 0.15dB/cm can be obtained. Liquid-phase epitaxial thin film growth has so far produced Nd^{3+} and Yb^{3+} doped YAG, 2D waveguide lasers. Extension to new materials and production of 3D guides is currently under consideration. These guides have losses as low as 0.05dB/cm and have potential both as low threshold longitudinally pumped lasers and high average power side pumped devices.