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**LASER DIODE PUMPED WAVEGUIDE LASERS IN
NEODYMIUM-DOPED BK-7 GLASS**

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Abstract

Ion-exchange in neodymium-doped glasses has been used to fabricate waveguides which were optically pumped to realise lasers. The application of these lasers as light sources in glass substrates will enhance the functionality of integrated optic systems in glass, allowing integration of active and passive devices. To obtain practical light sources, the neodymium-doped waveguides must be laser diode pumped to provide compact laser systems. Since the power available from a single stripe laser diode is limited, it is necessary to design the waveguide so that its modal field pattern matches that of the laser diode, thereby minimising the pump power required from the laser diode for the waveguide laser to reach threshold. We report on the fabrication and characterisation of waveguide lasers pumped with a laser diode. These lasers operated in a continuous wave at a wavelength of 1059nm, and were single transverse mode at both the pump and lasing wavelengths. The variation of the waveguide laser thresholds with the waveguide dimensions reveals the existence of an optimum dimension which minimises the laser threshold. A laser threshold of 20mW from the pump source and an overall slope efficiency of 5% with respect to the laser diode output power was obtained.