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**FABRICATION AND APPLICATION
OF
FIBER BRAGG GRATING**

by

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ABSTRACT

This dissertation presents the fabrication, characterization and application of short period fiber Bragg grating (FBG). The FBG is inscribed on high germania boron co-doped optical fiber by phase mask method with a 244nm continuous wave frequency doubled Argon ion laser as a laser source. The FBGs with reflectivity ranging from 98 ~ 99.9%, bandwidth of 0.3 ~ 0.9nm and center wavelength of 1552.5 ~ 1553.5nm have been fabricated successfully with this method. The time taken for these inscriptions are within 10 to 30 minutes depending on alignment. The fabricated FBGs are characterized using both fiber amplifier (broadband source) and tunable laser source (narrow band source) as a probe source. The wavelength shift induced by temperature variation in the FBG is also studied. The thermal response is shown to be 0.010nm/°C. The FBG is utilised successfully in a gain-clamped EDFA and fiber laser system.

ABSTRAK

Disertasi ini adalah hasil kerja fabrikasi, pencirian and penggunaan celahan Bragg gentian (FBG) yang berkala pendek. FBG ini di cetak di dalam gentian optik khas yang mengandungi kandungan germanium dan boron yang tinggi. Cara yang digunakan ialah cara percetakan topeng fasa dengan menggunakan laser Argon ion yang mempunyai jarak gelombang 244 nm sebagai sumber cahaya. Kami telah berjaya menghasilkan FBG yang mempunyai peratus pantulan dari 98 ~ 99.9%, lebar jalur dari 0.3 ~ 0.9 nm and pusat jarak gelombang dari 1552.5 ~ 1553.5nm. Masa yang diambil untuk cetakan ialah 10 hingga 30 minit bergantung pada kedudukan gentian. Pencirian FBG dilakukan dengan menggunakan pembesar gentian dan sumber laser boletala sebagai sumber cahaya. Kadar perubahan jarak gelombang yang disebabkan oleh perubahan suhu pada FBG juga telah dikaji. Kadar tindakbalas suhu didapati bersamaan dengan 0.010nm/ °C. FBG ini telah berjaya digunakan didalam EDFA pembesaran-tetap dan sistem laser gentian.

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