

PLC-기반의 마흐-젠더 간섭계 센서 제작 및 특성 평가

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Fabrication and Characterization of PLC-based Mach-Zehnder Interferometer Sensor

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Abstract : In this paper, we have designed and fabricated optical waveguides based on the Mach-Zehnder Interferometer (MZI) for application to sensor. The evanescent-wave sensor based on the MZI principle has sufficiently high sensitivity to measure the change of the refractive index on surface of a waveguide. The waveguides were optimized at a wavelength of 1550 nm and fabricated according to the design rule of 0.45 delta%, which is the difference of refractive index between the core and clad. The fabrication of MZI optical waveguides was performed by a conventional Planar Lightwave Circuit (PLC) fabrication process. The fabricated MZI optical waveguide device was measured. According to the measurement result, the insertion loss of MZI optical waveguide device was below 3.5 dB and the polarization dependent loss (PDL) was within 0.1dB. In addition, we analyzed optical properties of MZI sensor according to the refractive index change of the sensor arm.

Key Words : Mach-Zehnder interferometer, optical sensor, evanescent-wave, Planar Lightwave Circuit, refractive index