

## Refractometric Optical Sensing by Using Photonics Mach-Zehnder Interferometer

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**Abstract :** An on-chip refractive index sensor with high sensitivity and large measurement range is demonstrated in this paper. The sensing structures are based on Mach-Zehnder interferometer configuration, built on the SOI substrate. The wavelength sensitivity of the sensor is estimated to be 3129 nm/RIU. Meanwhile, according to the interference pattern period changes, the measured period sensitivities are 2.9 nm/RIU (TE mode) and 4.21 nm/RIU (TM mode), respectively. As such, the wavelength shift and the period shift can be used for fine index change detection and larger index change detection, respectively. Therefore, the sensor design provides an approach for large index change measurement with high sensitivity.

**Keywords :** Mach-Zehnder interferometer, nanotechnology, refractive index sensing, sensors

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