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Abstract

Fabrication and Characterization of SU8 Polymeric Microring Resonators for Biosensors

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In this paper, SU8 polymer was used to fabricate a waveguide and microring resonator for optical biosensing applications in liquid mediums. Microring resonators offer the advantage of reducing the device size by orders of magnitude without scarifying the interaction length. The strength of the interaction can be measured by their resonance wavelength shift at high quality-factor (Q) resonance. High Q factor enables the achievement of high sensitivity due to the long residence times of the photons that propagate in the ring, which increases the probability of photons interacting with the analytes in solution. The refractive index contrast between liquid and polymer waveguide controls the resonance wavelength and strength of coupling between the waveguide and resonator. Preliminary simulation and theoretical calculation using Rsoft Photonics CAD are presented. Fabrication steps and results obtained by using UV photolithography and electron beam lithography showing the fabrication of microring with 200μm of radius, 200nm of critical coupling gap are presented. Characterization of the SU8 waveguide including propagation and bending losses were performed by using HeNe laser 632.8 nm wavelengths. Future work on microring resonator characterization such as Q factor, resonance wavelength shift using visible wavelength are currently in progress. Initial work on the application of biosensing will also be shown.

Keywords*: micro ring resonators, optical biosensors, label-free detection, polymer waveguide, integrated optics*