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Microring Resonators for Biochemical Sensing AYCA YALCIN, JOHN C. ALDRIDGE, Dept. of ECE, Boston University, KETUL C. POPAT, TEJAL A. DESAI, Dept. of BME, Boston University, NABIL CHBOUKI, Little Optics, Inc., M. SELIM UNLU, Dept. of ECE, Boston University, BENNETT B. GOLDBERG, Dept. of Physics, Boston University — Resonant microcavities have recently become popular for research in optical biosensor applications. Whispering Gallery Mode (WGM) microresonators are preferred as active sensing surfaces due to their high-Q values which provide measurable shifts in mode frequencies as surface characteristics change. In this study, the active sensing surface is a microring resonator vertically coupled to waveguides and mounted to a flow cell. Resonant transmission at a specific wavelength is measured as a function of time as flow solution concentrations are varied, and high sensitivity to surface refractive index changes and repeatability are demonstrated. To investigate Avidin-Biotin binding, surfaces are modified with silane and Avidin, followed by Biotinylated Lectin flow. Surface characterization performed by ellipsometry and XPS shows successful deposition of discrete layers. Preliminary results show detection of binding and near complete regeneration of the sensing surface, indicating a high potential for sensitive and selective biosensor applications of microring resonators.

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