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Evanescent field response to affinity binding on a planar optical waveguide.[1] MATTHEW STEPHENS, Colorado State University, GUANGWEI YUAN, KEVIN LEAR, DAVID DANDY — The need for a selective, multianalyte biosensor capable of detecting target molecules with high sensitivity has long been recognized. In this project, a novel means of detecting target affinity binding interactions is under development, whereby a shift in the evanescent wave surrounding the core of an ultra thin ($<$ 1 micron) optical waveguide is monitored. The bound analytes cause a localized refractive index change at the surface of the waveguide, which in turn causes the evanescent field to shift. In this study, analyte binding is determined from a two-dimensional light intensity plot generated by a near field scanning optical microscope (NSOM) as a hollow AFM tip is rastered across the surface of the waveguide. The probe/analyte regions are physically mimicked using several techniques such as (1) direct contact printing of proteins or polystyrene spheres, (2) capture of conjugated nanoparticles using the avidin-biotin interaction in an immunoassay, and (3) microfluidic networks. The evanescent field response characteristics of the sensor to these features determined using NSOM are presented.

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