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Evanescent field response to patterned features on a planar waveguide measured with a buried detector array.[1] MATTHEW STEPHENS, GUANGWEI YUAN, AHMAD AL-OMARI, KEVIN LEAR, DAVID DANDY — The evanescent field of an appropriately designed waveguide can be very sensitive to the local refractive indices of the cladding layers surrounding the core. In this study, a planar waveguide has been fabricated on a chip that contains buried p-Si photo-detectors, located about 1 micron from the waveguide core and arrayed down the length of the waveguide. Local changes in the index of the upper cladding, such as the formation of an adlayer, result in signal changes at the detector. The buried detector format provides significant opportunities for localized detection of chemical or biological analytes in complex milieu through monitoring of the evanescent field. To test the responses to refractive index changes in the upper cladding, small photoresist features were fabricated on the surface of the waveguide. This material was selected because it is easily patterned, its thickness can be tightly controlled, and its refractive index is similar to that of biological molecules. The results of the experiments measuring evanescent field intensity as well as detector fabrication details will be presented; these results are compared with parallel numerical modeling studies.

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