Abstracts

Numerical analysis of near-infrared wave propagation characteristics in dielectric-coated parallel planar microstructural waveguides

W.E.A. Van Petegem, C.R. James, F.E. Vermeulen and A.M. Robinson. "Numerical analysis of near-infrared wave propagation characteristics in dielectric-coated parallel planar microstructural waveguides." 1997 Transactions on Microwave Theory and Techniques 45.3 (Mar. 1997 [T-MTT]): 367-375.

In this paper, the properties of electromagnetic (EM) wave propagation in layered planar microstructural waveguides are investigated. Analytical and numerical results are presented on the propagation of a 1-/spl mu/m EM wave in a parallel planar waveguide. Its walls are made of Au or Si, coated with a thin layer of SiO/sub 2/ and separated by a fluid. The propagation characteristics of even and odd TE and TM modes are described as a function of the coating thickness. It is shown that the propagation of TE modes exhibits a sudden shift in power flow distribution from the fluid to the coating when the coating thickness exceeds a critical value. This property may be exploited for micromachined sensor applications. TM modes do not exhibit this behaviour.

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