Abstracts

Scattering Pattern Measurement and Analysis of Sputtered-Glass Optical Waveguides for Integrated Optics

M. Imai, Y. Ohtsuka and M. Koseki. "Scattering Pattern Measurement and Analysis of Sputtered-Glass Optical Waveguides for Integrated Optics." 1982 Transactions on Microwave Theory and Techniques 30.4 (Apr. 1982 [T-MTT] (Joint Special Issue on Optical Guided Wave Technology)): 635-641.

The radiation patterns from optical waveguides prepared by sputtered 7059 glass thin film onto pyrex glass substrates are measured in order to clarify the loss mechanisms producing the scattering. The angular distributions of the scattered light can be explained by the presence of its surface roughness at film-substrate and film-air inter-faces and/or of bulk inhomogeneities of the waveguide core. For waveguides with a relatively high loss of several dB/cm, for example, the patterns are consistent with the theory based on a cross-correlated model of these imperfections, assuming correlation lengths of the order of 0.1Lambda in the normal direction and of the same order as the wavelength Lambda in the parallel direction to the waveguide. The rms value of surface roughness to that of bulk inhomogeneities divided by alpha is also determined by comparing the measured scattering curves with the theoretically calculated curves.

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