Abstracts

Precise Millimeter-Wave Measurements of Complex Refractive Index, Complex Dielectric Permittivity and Loss Tangent of GaAs, Si, SiO/sub 2/, Al/sub 2/O/sub 3/, BeO, Macor, and Glass

M.N. Afsar and K.J. Button. "Precise Millimeter-Wave Measurements of Complex Refractive Index, Complex Dielectric Permittivity and Loss Tangent of GaAs, Si, SiO/sub 2/, Al/sub 2/O/sub 3/, BeO, Macor, and Glass." 1983 Transactions on Microwave Theory and Techniques 31.2 (Feb. 1983 [T-MTT] (Special Issue on Millimeter-Waves)): 217-223.

Highly accurate continuous spectra of the complex refractive index and complex dielectric permittivity are given in the millimeter range for a variety of potentially useful materials. The absorption coefficient is found to increase monotonically with increasing frequencies. Small amounts of glassy inclusions or water were found to increase losses at all frequencies, but impurities and radiation damage (except in semiconductors) have not yet proved to be detrimental to performance. Materials have been found for which the millimeter-wave losses can be tolerated when used as dielectric waveguide, high-power windows, and other applications. Nominal consideration must be given, however, to the conditions of preparation and the nature of contaminants, The measurements were made in a modular, polarizing, dispersive Fourier-transform spectrometer.

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