

The control of errors in i.r. spectrophotometry—III. Transmission measurements using thin cells.

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Streszczenie

In the determination of accurate transmission intensities the use of a compensating cell in the reference beam of an i.r. spectrophotometer is only feasible for measurements on dilute solutions. Spectra of pure liquids and solids must be obtained with an open reference beam and the radiation losses in the cell must be computed by the application of classical optical theory to the passage of the radiation through the cell system. This creates special problems where the absorption bands are strong and thin films must be used in which the path length is of the same order as the wavelength. Reflection and interference phenomena in the cell system are considered quantitatively as also are the effects of the convergence of the incident beam, the probable non-parallelism of the cell windows, the polarization discrimination of the spectrophotometer and the imperfect polish of the cell windows. It is shown that the non-parallelism of the cell windows can introduce significant errors in intensity measurements and a method is described for determining the wedge effect in the cell cavity and for the measurement of the transmission when such wedge shaped cells are used in convergent radiation beams. Computer programs to deal with these problems have been developed and will be available.

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