ABSORPTION ANOMALIES IN RATIO AND SUBTRACTION FOURIER TRANSFORM INFRARED SPECTROSCOPY

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Subtraction and ratioing of strong absorption bands in Fourier transform infrared (FTIR) spectroscopy can produce large absorbance anomalies. One type of anomaly is attributed to instability in the wavenumber scale of the FTIR spectra. A possible cause of this anomaly is explored. The thermal expansion and contraction of the cavity of the HeNe reference laser from a typical commercial instrument was found to produce changes in the laser wavenumber of ± 0.034 cm^{-1}. Changes of this size are shown to introduce absorbance errors into the wavenumber scales of FTIR spectra which are sufficient to produce the observed absorbance errors. The dependence of the error on instrumental and spectroscopic parameters is explored. Solutions to the problem are proposed.