

EXPANDED CHOICES FOR VIBRATION-ROTATION SPECTROSCOPY IN THE PHYSICAL CHEMISTRY TEACHING LABORATORY

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Many third-year physical chemistry laboratory students in the US analyze the vibration-rotation spectrum of HCl in support of lecture concepts in quantum theory and molecular spectroscopy. Contemporary students in physical chemistry teaching laboratories increasingly have access to FTIR spectrometers with $1/8\text{th cm}^{-1}$ resolution, which allows for expanded choices of molecules for vibration-rotation spectroscopy. Here we present the case for choosing HBr/DBr for such a study, where the $1/8\text{th cm}^{-1}$ resolution enables the bromine isotopic lines to be resolved. Vibration-rotation lines from the fundamental and first-overtone bands of four hydrogen bromide isotopomers are combined in a global analysis to determine molecular spectroscopic constants. Sample production, spectral appearance, analysis and results will be presented for various resolutions commonly available in teaching laboratories.