

VOC Mixture Composition Analysis: Quantification of an EPA VOC Standard Mixture Using the BrightSpec Chirped-Pulse Fourier Transform Spectrometer

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BrightSpec introduces benchtop chirped-pulse millimeter wave spectroscopy for gas mixture analysis. The detection and quantification of volatile organic compounds (VOCs) is of particular importance for environmental monitoring and headspace residual solvent analysis. Fourier transform infrared (FTIR), gas chromatography (GC)- flame ionization detection, and GC-mass spectroscopy have significant limitations in terms of absolute specificity and trace level detection of small volatiles. Even with separation and purification, fingerprinting structurally similar species remains difficult for these techniques even with vast libraries of molecular fingerprints in existence for these analytical techniques. We present the composition analysis of standard Environmental Protection Agency (EPA) VOC mixture using the Bright-Spec spectrometer without column separation. The BrightSpec CP-FT instrument takes advantage of intrinsic qualities of rotational spectroscopy, such as its dependence on the three-dimensional structure of a molecule and the high-resolution of millimeter-wave spectroscopic techniques. As such, distinctions between isomers, conformers and isotopologues are easily addressed. Linearity and detection limits (< 100 ppb) of VOCs are demonstrated and composition analysis of a standard EPA VOC mixture is presented.