

## PULSED MOLECULAR BEAM FOURIER TRANSFORM MICROWAVE SPECTROSCOPY OF $\alpha$ -PINENE AND $\beta$ -PINENE

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Chemical analysis of fire debris is often conducted to determine whether accelerants were employed. The GC and GC/MS methods used in these analyses do not always offer the chemical specificity that the forensic chemist would like, however. In an effort to demonstrate the potential application of the Fourier-transform microwave (FTMW) spectrometer as a chemically-specific forensic tool we have collected the pure rotational spectra of the major constituents of one possible accelerant, turpentine. The major constituents are  $\alpha$ -pinene and  $\beta$ -pinene, and their spectra have been recorded from 8 GHz to 20 GHz. The spectrum of  $\beta$ -pinene has been assigned, and the rotational constants  $A = 1901.8889 \pm 0.00048$  MHz,  $B = 1293.66095 \pm 0.00026$  MHz, and  $C = 1150.83126 \pm 0.00010$  MHz, as well as several distortion constants, have been extracted from the data. Stark data have also been collected, from which the dipole moment will be determined. The spectrum of  $\alpha$ -pinene is currently under analysis. Because the rotational spectra for  $\alpha$ -pinene and  $\beta$ -pinene are distinct, the relative amounts of the two constituents in a sample could be determined, something that would be useful in deciding if the detected pinenes are of natural origin or not.