IRD 3 Application Note

Amphetamines

Introduction

Designer drugs are becoming an ever increasing problem for law enforcement authorities. The so called "street chemists" are often attempting to skirt the law by producing "legal" substances which are structurally very similar to know drugs of abuse. In many cases the designer drugs result in the physiological effect much like the parent drug and in some cases have additional very harmful side effects. In order to successfully prosecute these underground activities, it is very important to be able to reliably determine the exact structure of the particular designer drug.
One of the very common encountered drugs of abuse which has seen a large increase in the number of analogs is amphetamine. This drug is often referred to as "Speed" and is a powerful stimulant which can lead to physical dependence. Below in Figure 1 are the structures of amphetamine and three of its sidechain positional isomers.

Product Overview

The IRD 3 is designed from the chromatographer's point-of-view and is the only analytical infrared instrument that seamlessly combines the separating power of the Gas Chromatography with the molecular identification of FTIR.

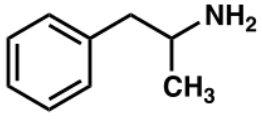
- Dedicated FTIR for use with GC
- Low maintenance and easy to use
- Small footprint
- Software interfaces with GC control software
- Seamless integration with MS

The IRD 3 is the perfect tool for the chromatographer looking to obtain more information about unknown samples. Using a heater light pipe flow cell, the sample is kept in a vapor state while interacting with IR. This allows the molecules to freely rotate in a low energy environment. Keeping the molecular geometry in tack during analysis provides unique and highly reproducible spectra.

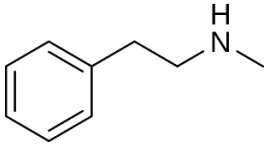
Results

In addition to analysis by the IRD, this mixture was also analyzed by mass spectrometry. This mixture was differentiated by the MSD except for amphetamine (I) and N-methylphenethylamine (II). The IR spectra for compounds I and II are shown in Figure 2. As can be seen, the main differences in these spectra are in the position and intensity of C-H stretching (2800-3100cm-1), in the strong NH2 deformation band for amphetamines (1600cm-1) and in the secondary amine absorption for N-methylphenethylamine (1400-1500cm^{-1}). These spectral differences are sufficient for the IRD to readily distinguish between the two compounds.

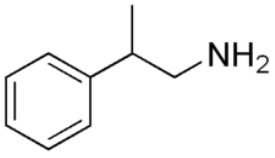
Figure 1.



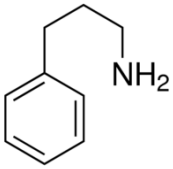
I. Amphetamine



II. N-methylphenethylamine



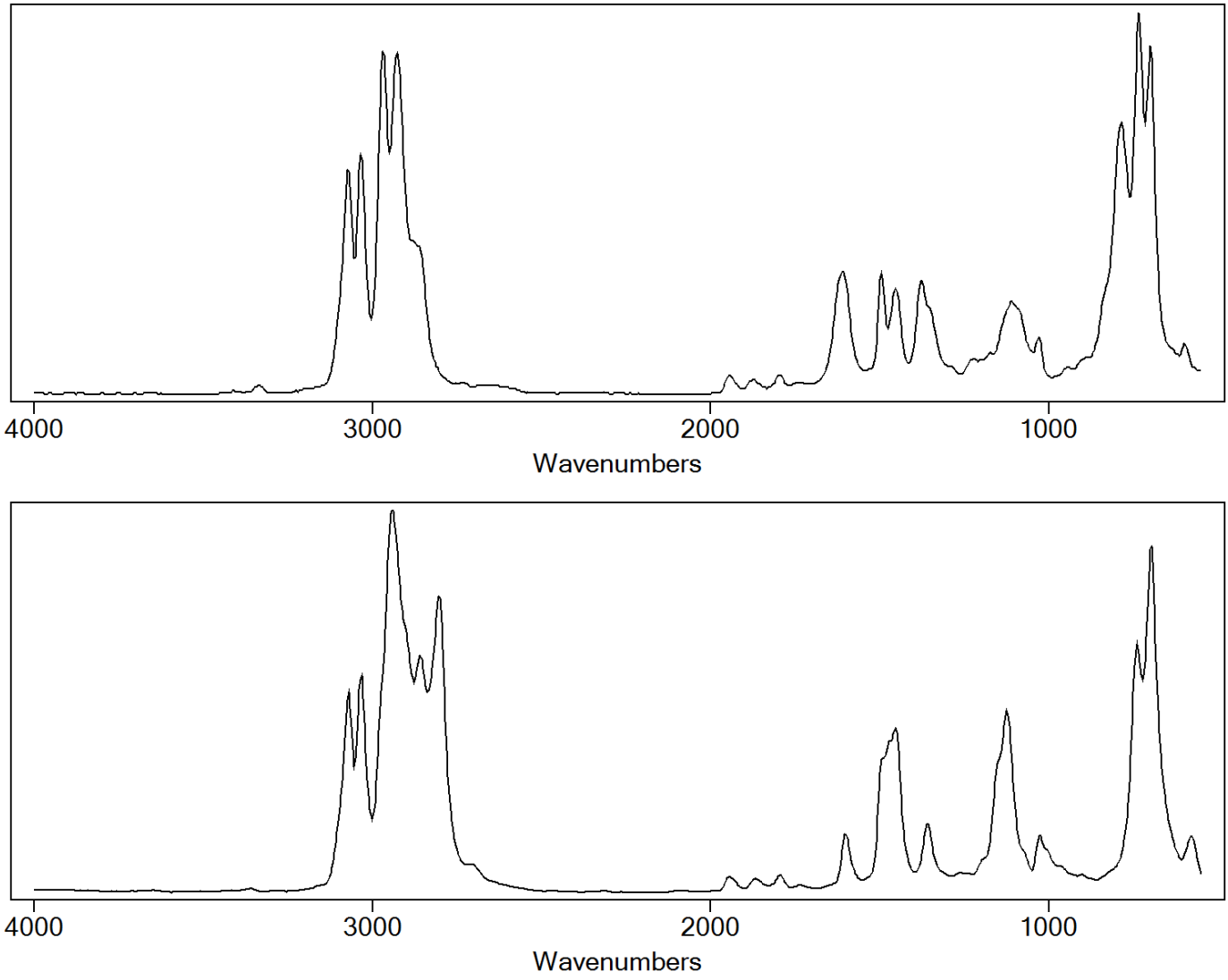
III. β-methylphenethylamine



IV. 3-phenyl-1-propylamine

1511 Neave Street
Covington, KY 41011
p. 859-581-6990
f. 859-581-6821
info@asapanalytical.com
www.asapanalytical.com

Figure 2.



Conclusion

For samples as similar as 2,3 – MDPV and 3,4 – MDPV differentiation by GC-MS is impossible. The IRD 3 is the perfect tool to assist the chromatographer in making a positive ID. The IRD 3 uses a heater light pipe flow cell, the sample is kept in a vapor state while interacting with IR. This allows the molecules to freely rotate in a low energy environment. Keeping the molecular geometry in tack during analysis provides a unique and highly reproducible spectra.