

GC.IRD

Application Note: Forensics 4

Rapid, Quantitative Determination
of the enantiomers of
methamphetamine

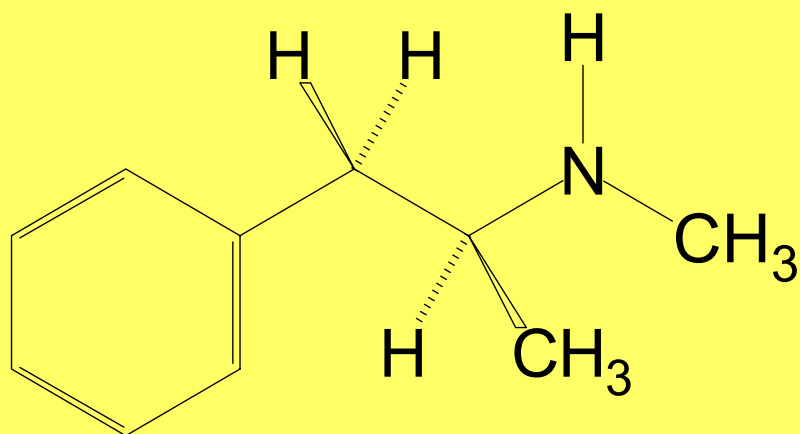


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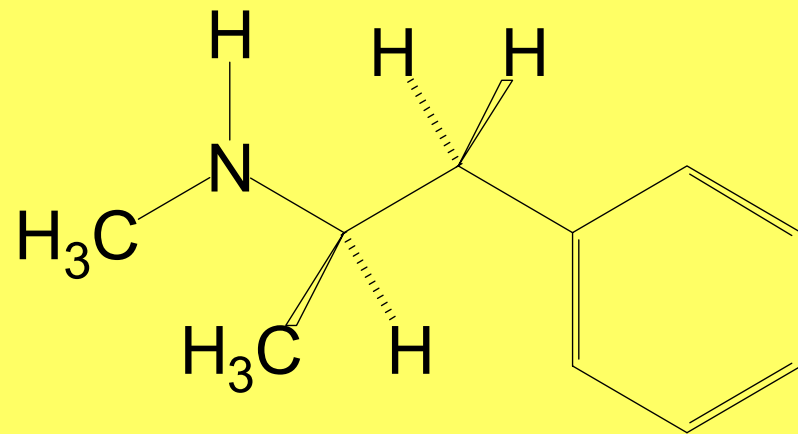
Context:

- Methamphetamine has two isomers.
- D-Methamphetamine is the common "Drug of Abuse".
- L-Methamphetamine is the active ingredient in a popular nasal inhaler.
- The isomers are mirror images.

Methamphetamine Structures



D-Methamphetamine



L-Methamphetamine

Problem

- Standard GC analysis does not separate the two methamphetamines.
- MS analysis gives identical spectra.
- IR analysis gives identical spectra.
- GC.MSD and GC.IRD are not suitable
 - At least on the surface....

GC Separations of Stereoisomers

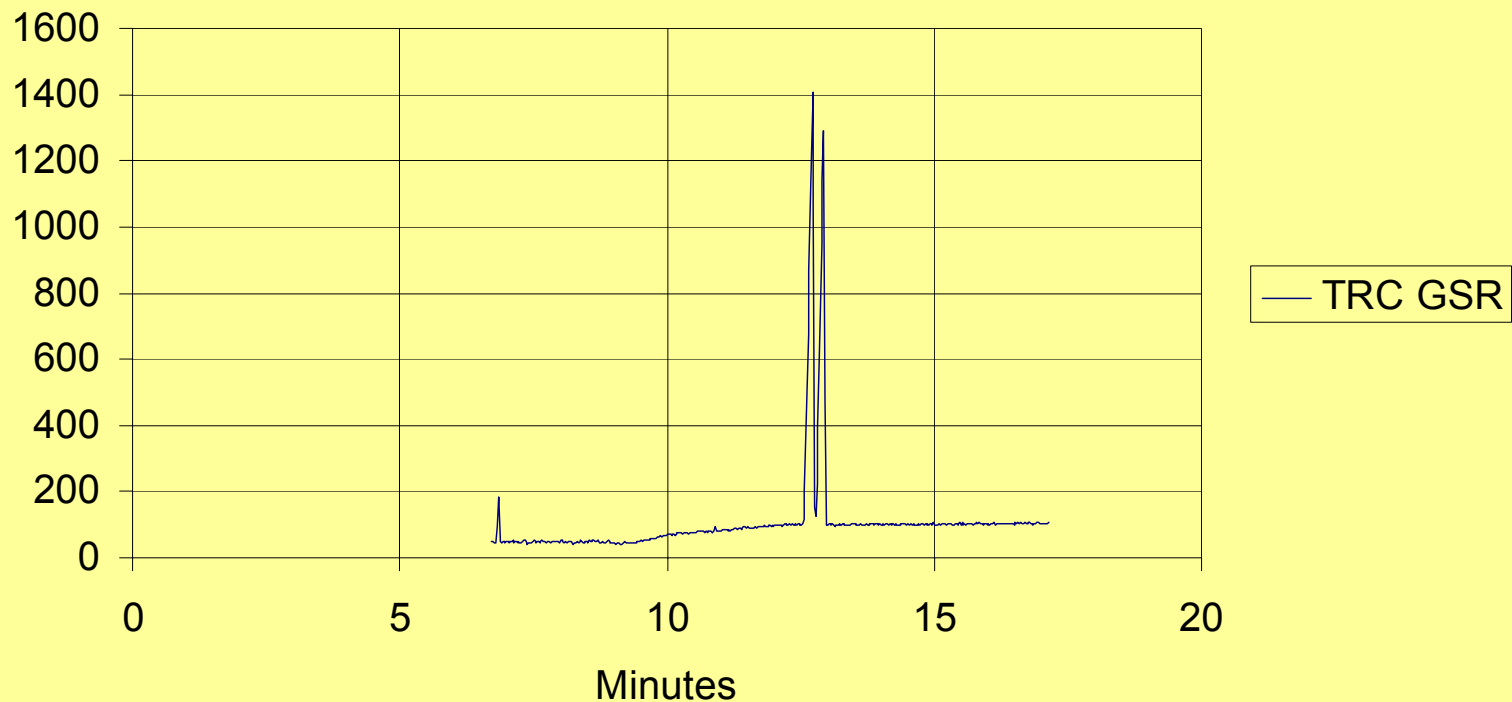
- Trifluoroacetylpropyl chloride (TFAP) Derivatives of Enantiomers can be separated by GC.
- Very easy, simple preparation.
 - Basic extraction into Chloroform.
 - Add 8-12 drops TFAP solution and cap.
 - Agitate for 30-60 minutes.
 - Inject onto GC.

HP-5 Conditions

- Agilent 6890 GC
- ASAP IRD II
- HP-5 2.0 mL/min
 - 25m x .32mm ID x .52 μ m coating
- 0.5 μ L Splitless
 - 80 mL/min Purge @ 0.75 min
- Inlet: 250° C
- Oven: 90° C (no hold)
 - 7° C/min to 116° C
 - 17.5° C/min to 200° C
 - 15° C/min to 235° C
 - Final Hold 10.00 min
- IRD II
 - Transfer Lines and Flow Cell: 270° C
 - Sweep regulators at 5 psig.

HP-5 Separation of TFAP Methamphetamines

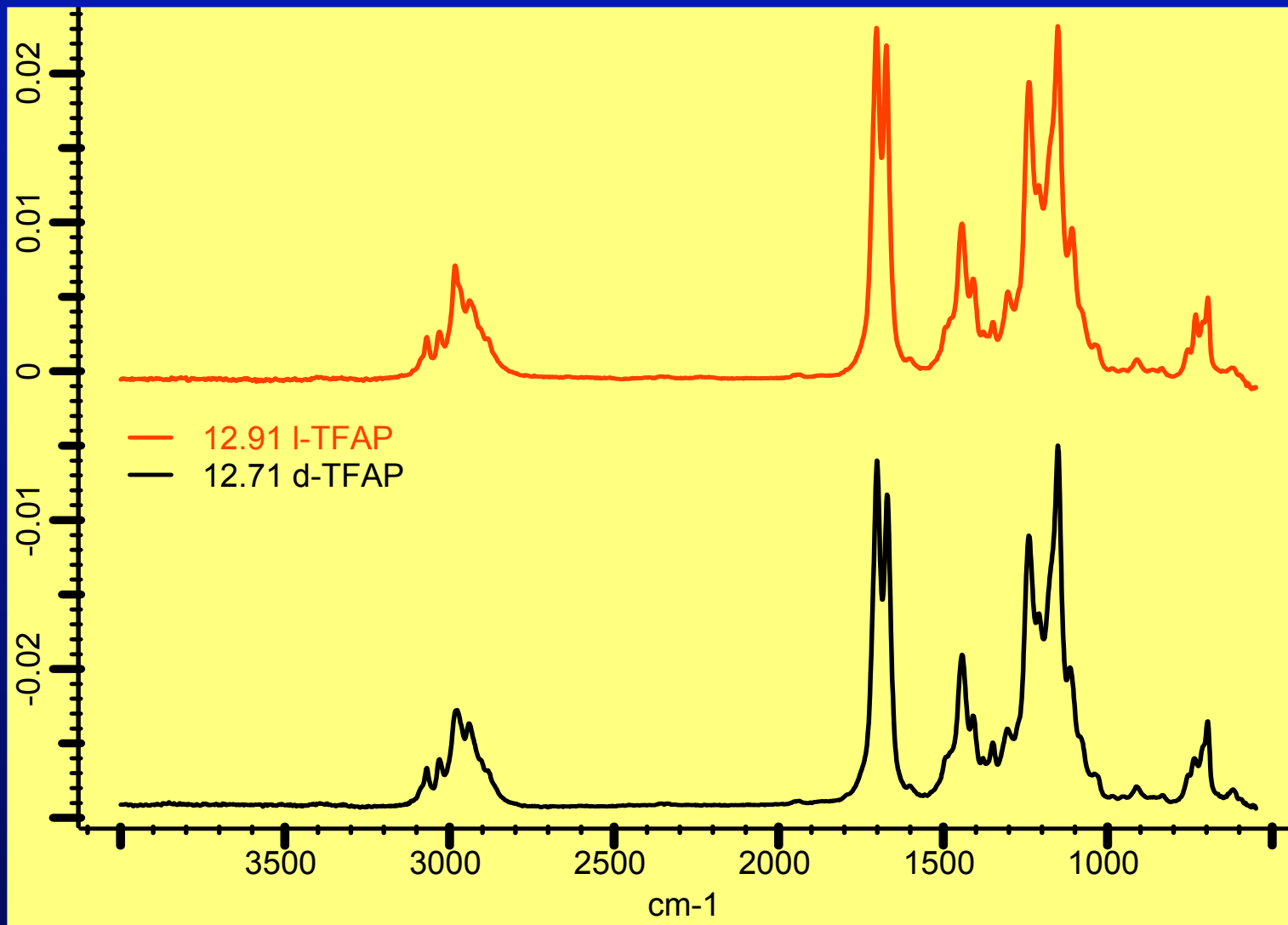
TFAP Derivatives of Methamphetamine Isomers -
0.5uL Splitless Injection



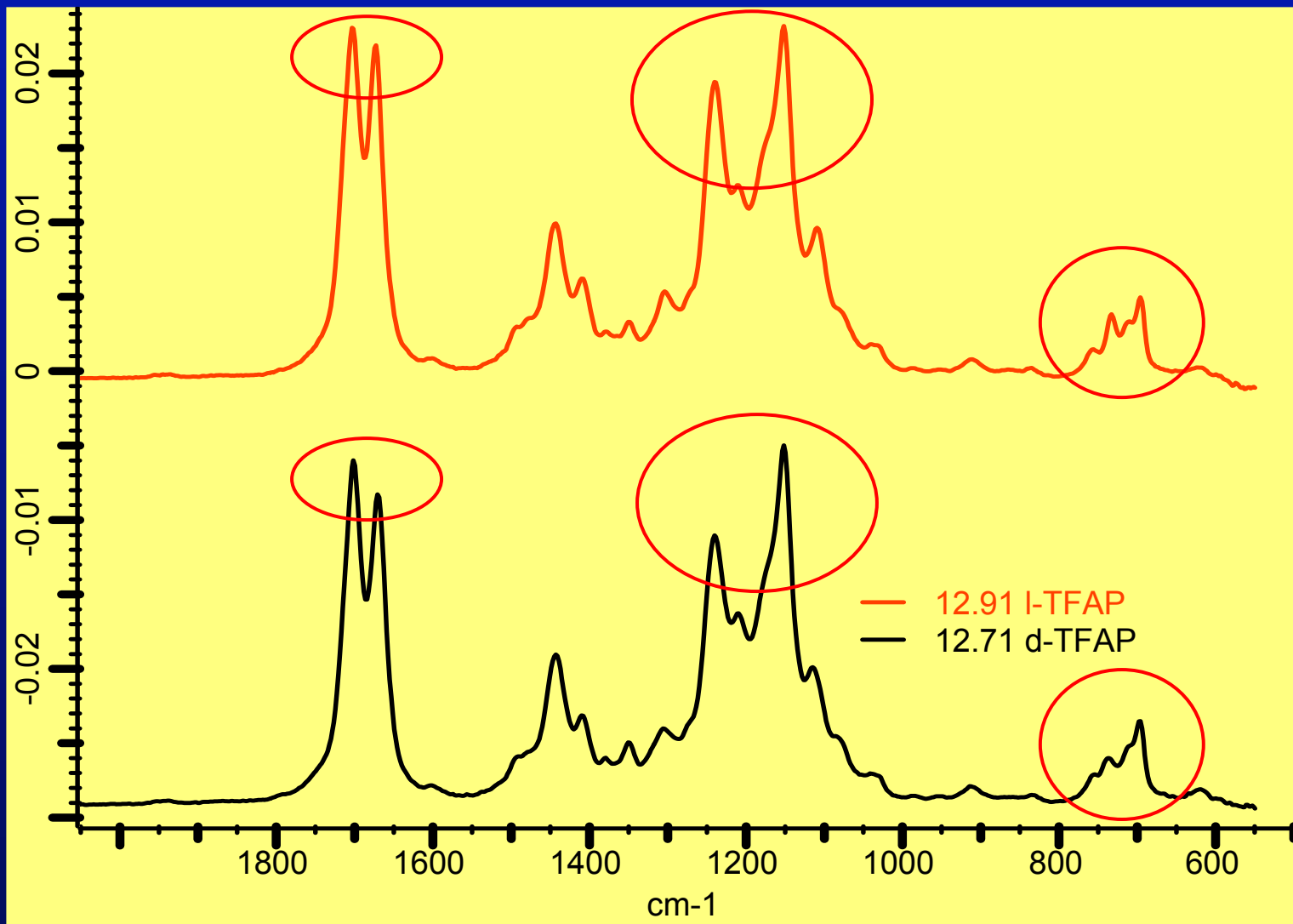
HP-5 Separation

- Nearly baseline separation.
- Rapid analysis.
- L-derivative elutes first based on standards.
- MSD shows no significant spectral differentiation the enantiomers.
- IRD does!

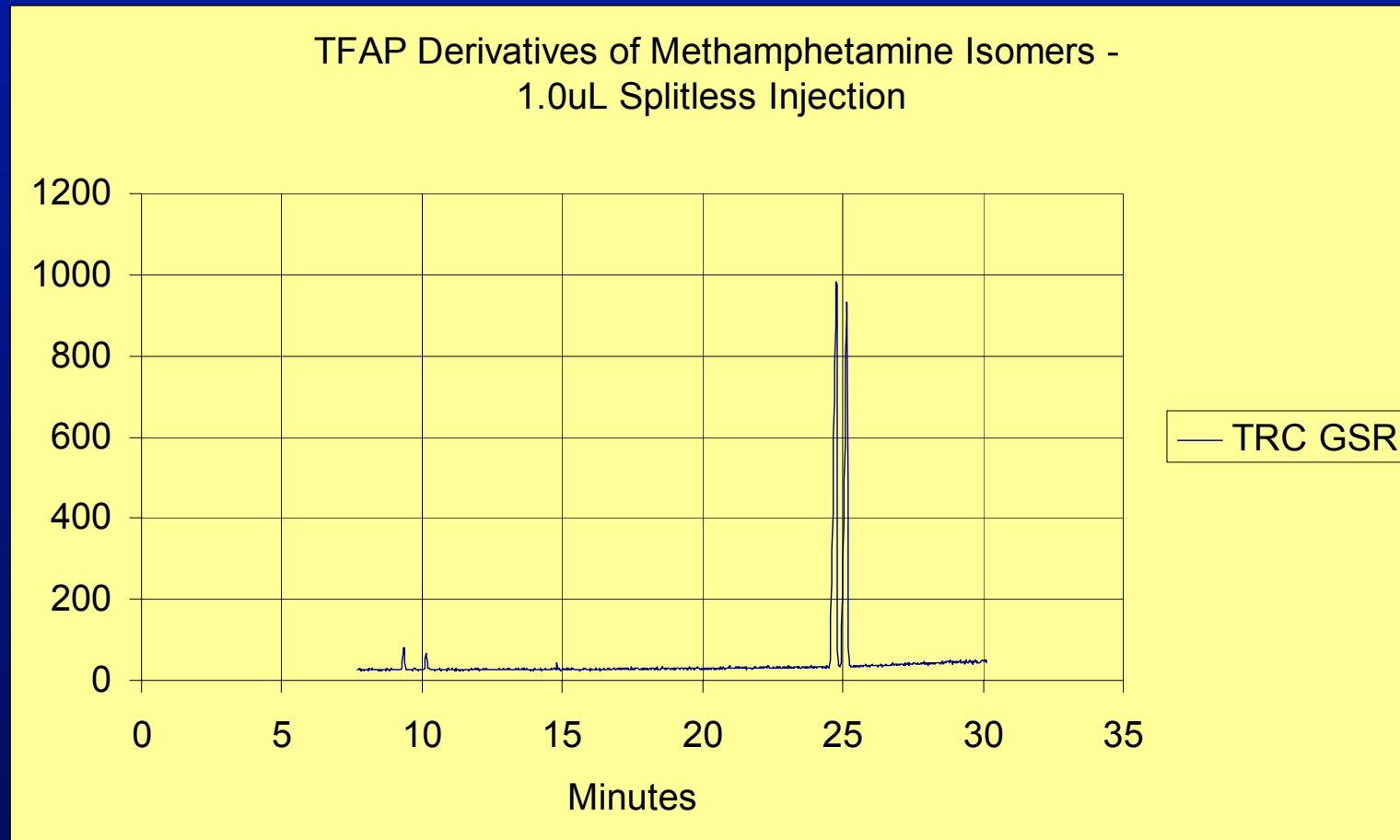
HP-5 IRD Spectral Results



Clear Spectral Differences



Improved Separation using DB-1301 Column



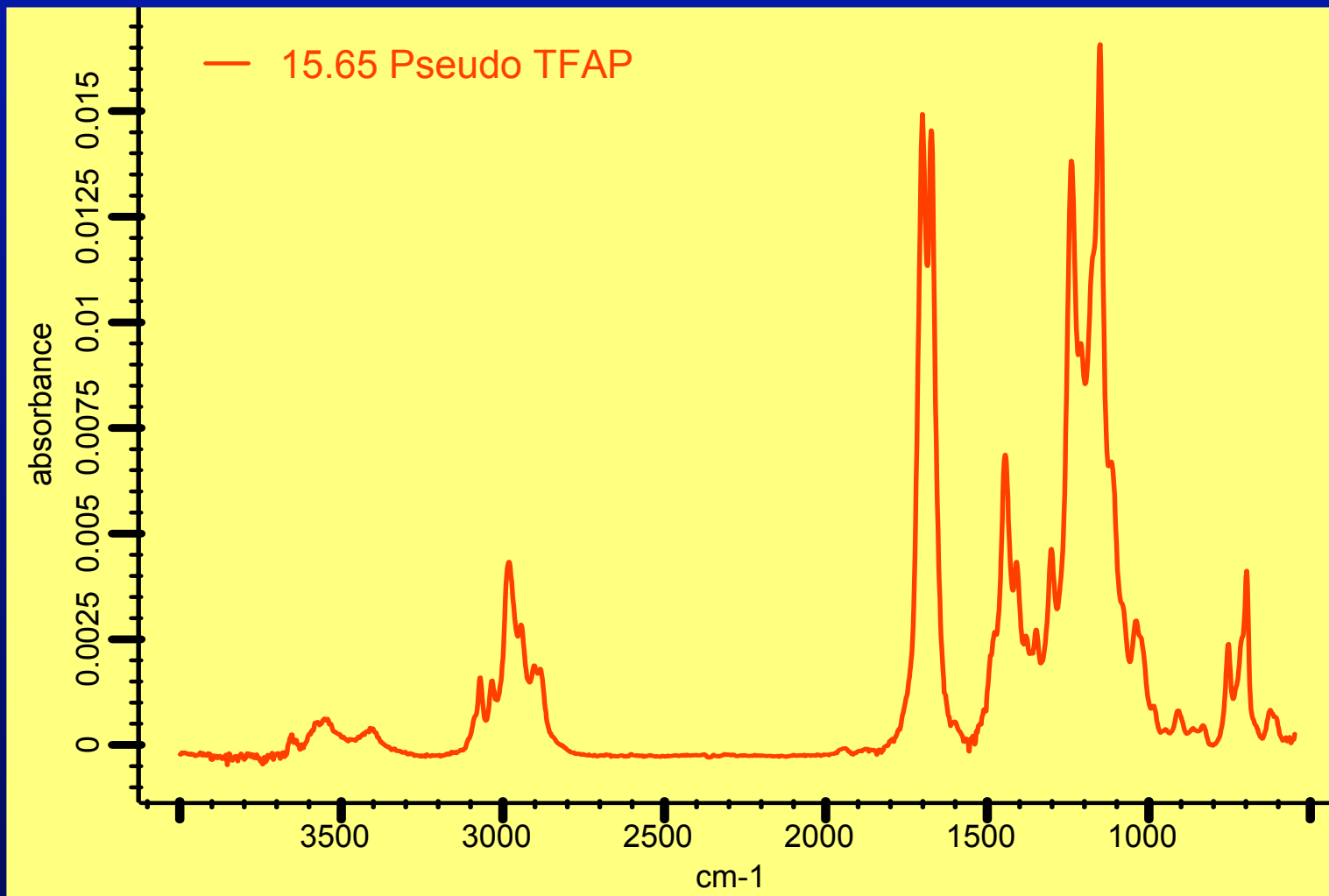
DB-1301 Separation

- Baseline separation.
- Rapid analysis.
- L-derivative elutes first based on standards.
- MSD shows no significant spectral differentiation the enantiomers.
- IRD does!

DB-1301 Conditions

- Agilent 6890 GC
- ASAP IRD II
- DB-1301
 - 30m x 0.25mm ID x 1.0 μ m coating
 - 2.0 mL/min
- 1.0 μ L Splitless
 - 50 mL/min Purge @ 0.70 min
- Inlet: 250° C
- Oven: 140° C (no hold)
 - 5° C/min to 275° C
 - Final Hold 10.00 min
- IRD II
 - Transfer Lines and Flow Cell: 270° C
 - Sweep regulators at 5 psig.

Pseudoephedrine TFAP Spectrum - Differentiated



Conclusions

- Methamphetamine Enantiomer TFAP Derivative determination by GC.IRD is rapid, effective, definitive.
- IRD provides confirmatory, spectral differentiation of the enantiomers.
- IRD of pseudoephedrine derivative different - clan lab starting material is differentiated.



ASAP IRD II Now Available
Call 1-877-987-2800



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