

# Gas Chromatography

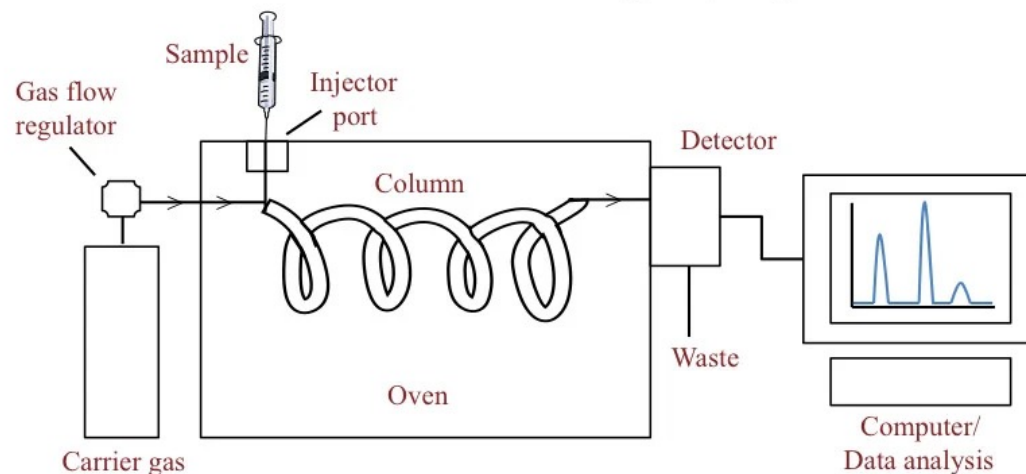
## Fundamentals & Cannabis Applications

Joseph DiVerdi

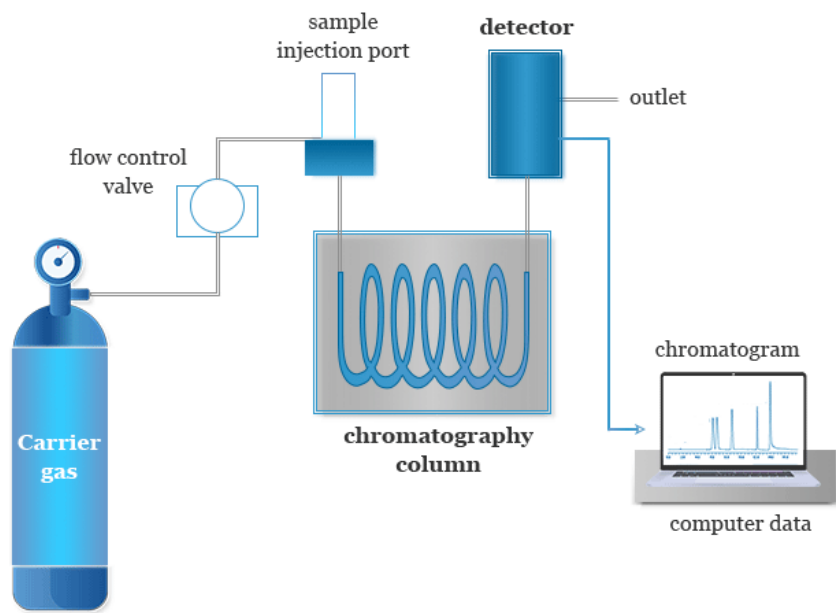
Department of Chemistry  
Colorado State University  
Fort Collins, CO USA  
January 2024

# GC – Block Diagram

## Gas Chromatography



## Gas Chromatography



# GC – Pictorial Layout

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# Column Oven – Where the Magic Happens

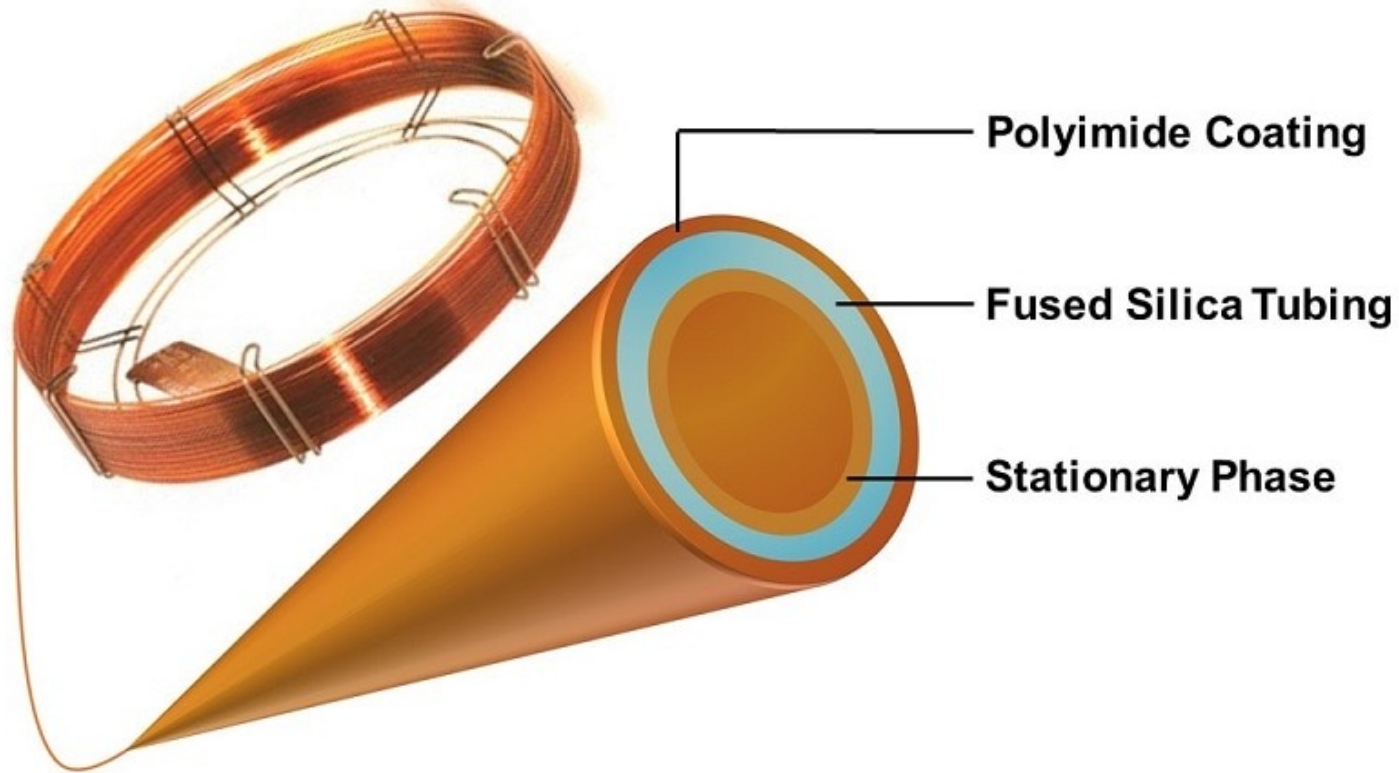
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# Column Overall Geometry

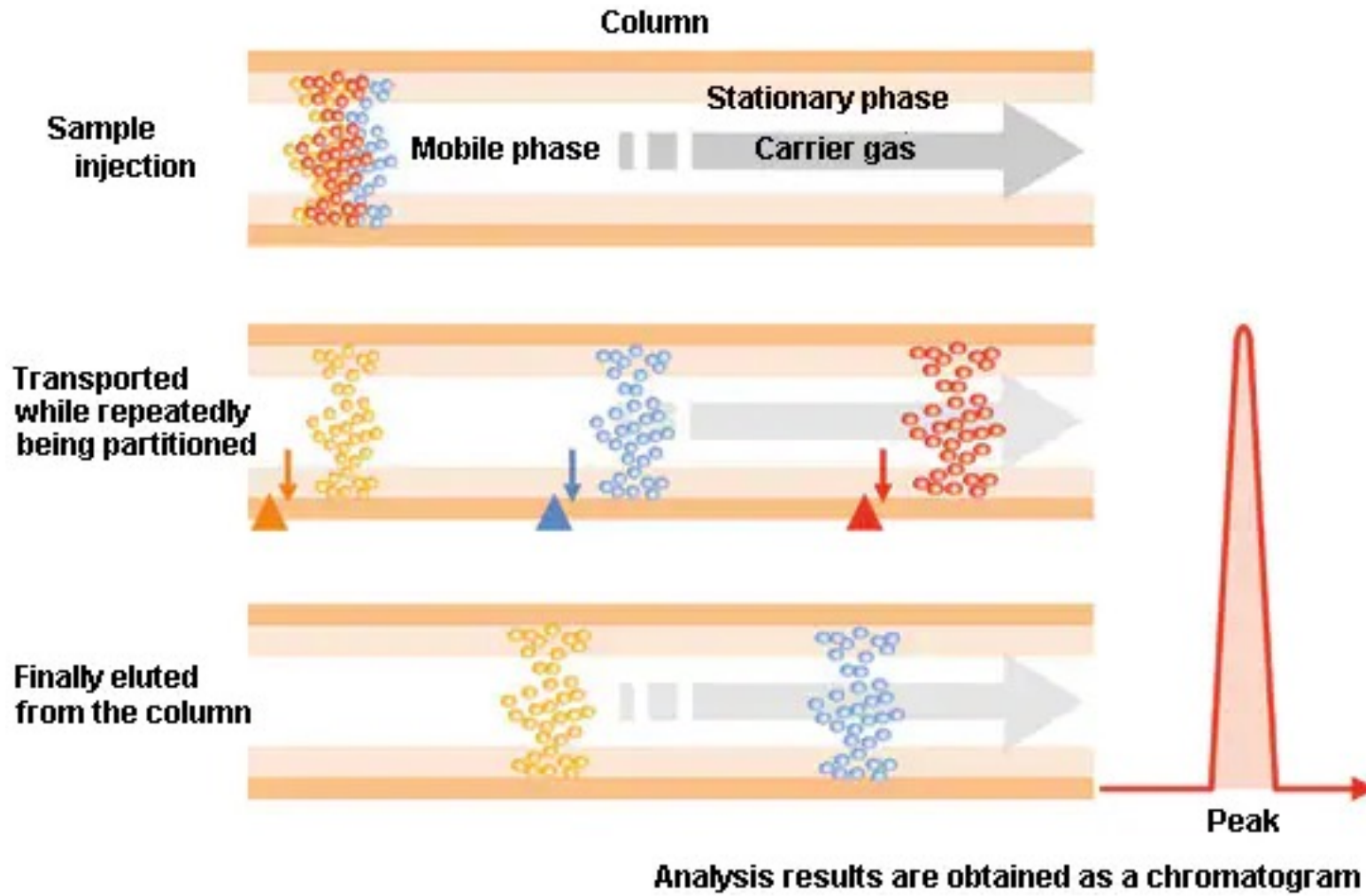
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# Separation Mechanism

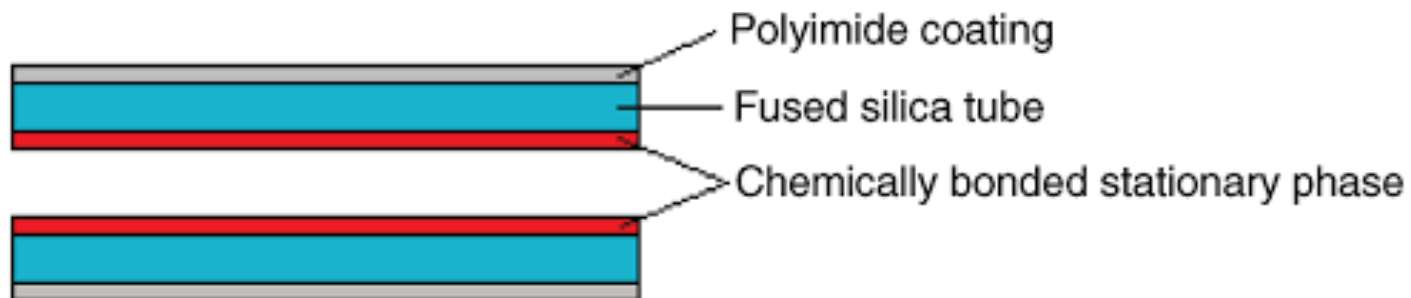
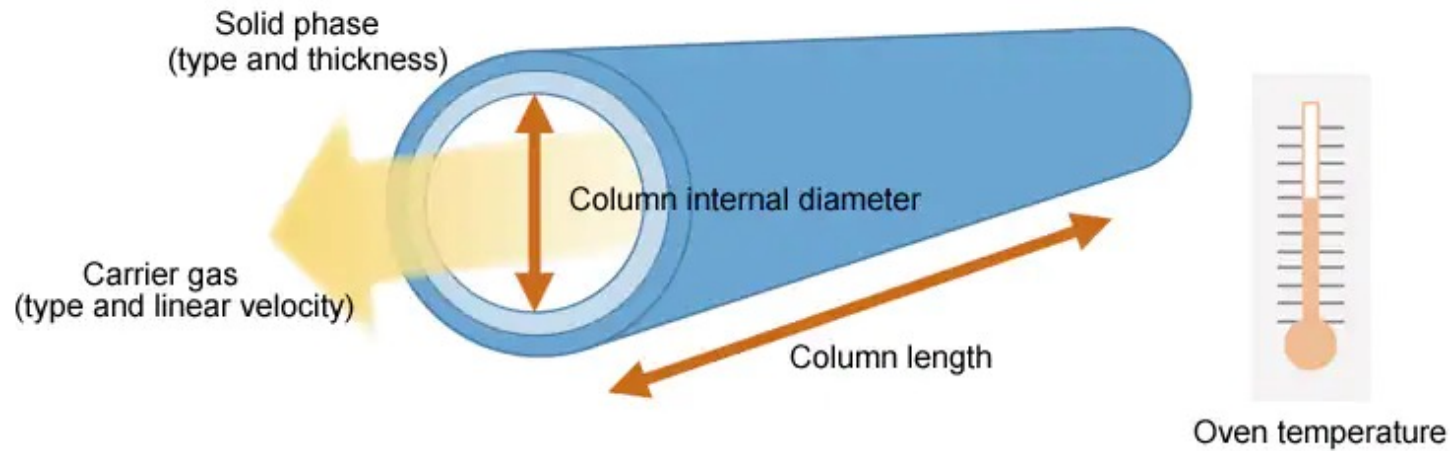
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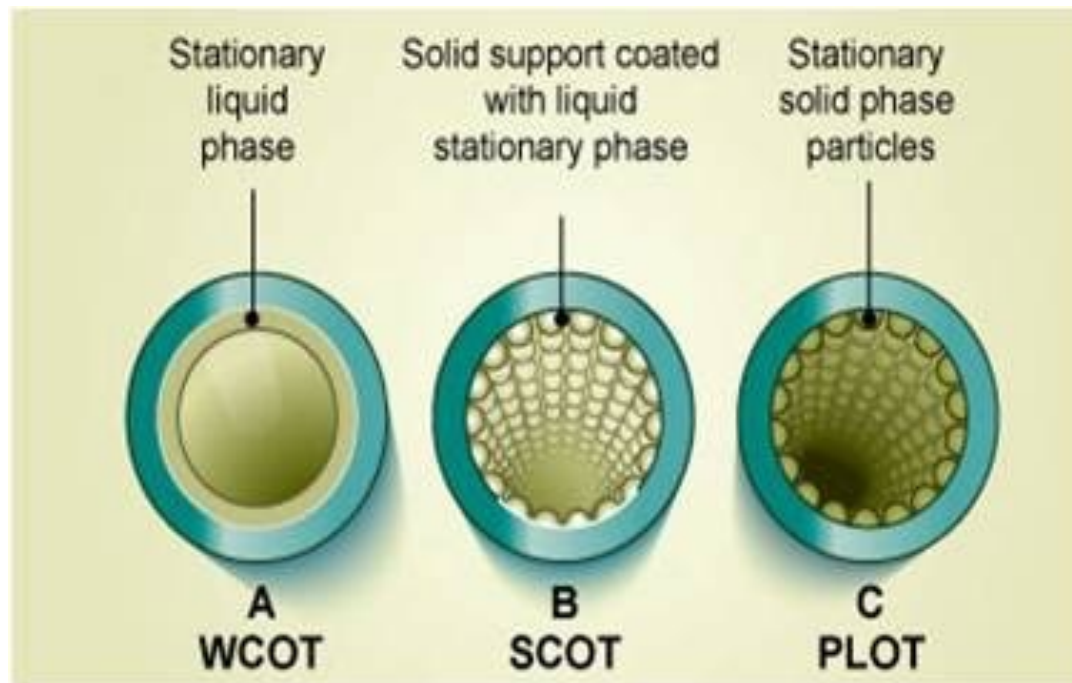
# Column Internal Details

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## Elements that Affect Separation



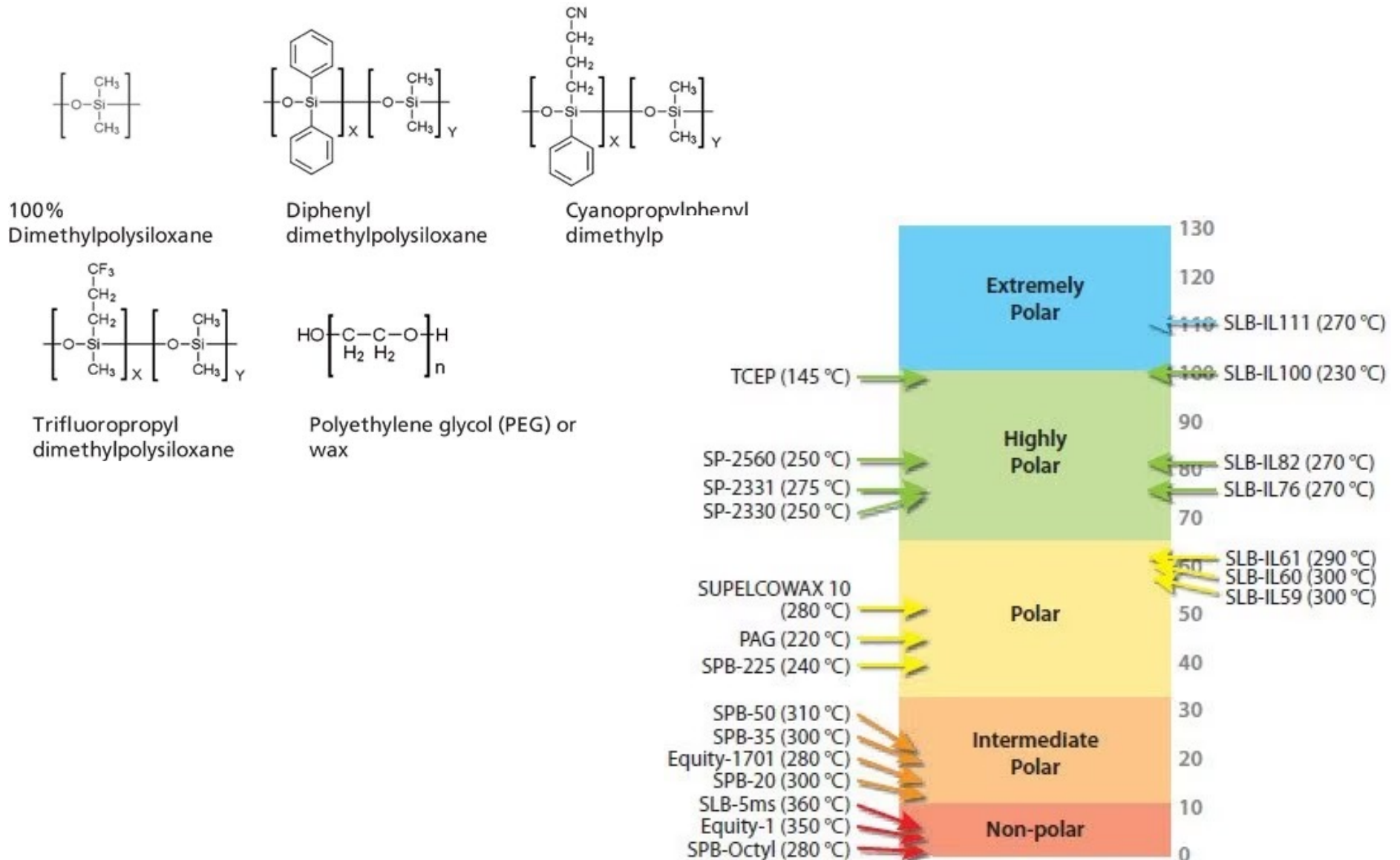
text





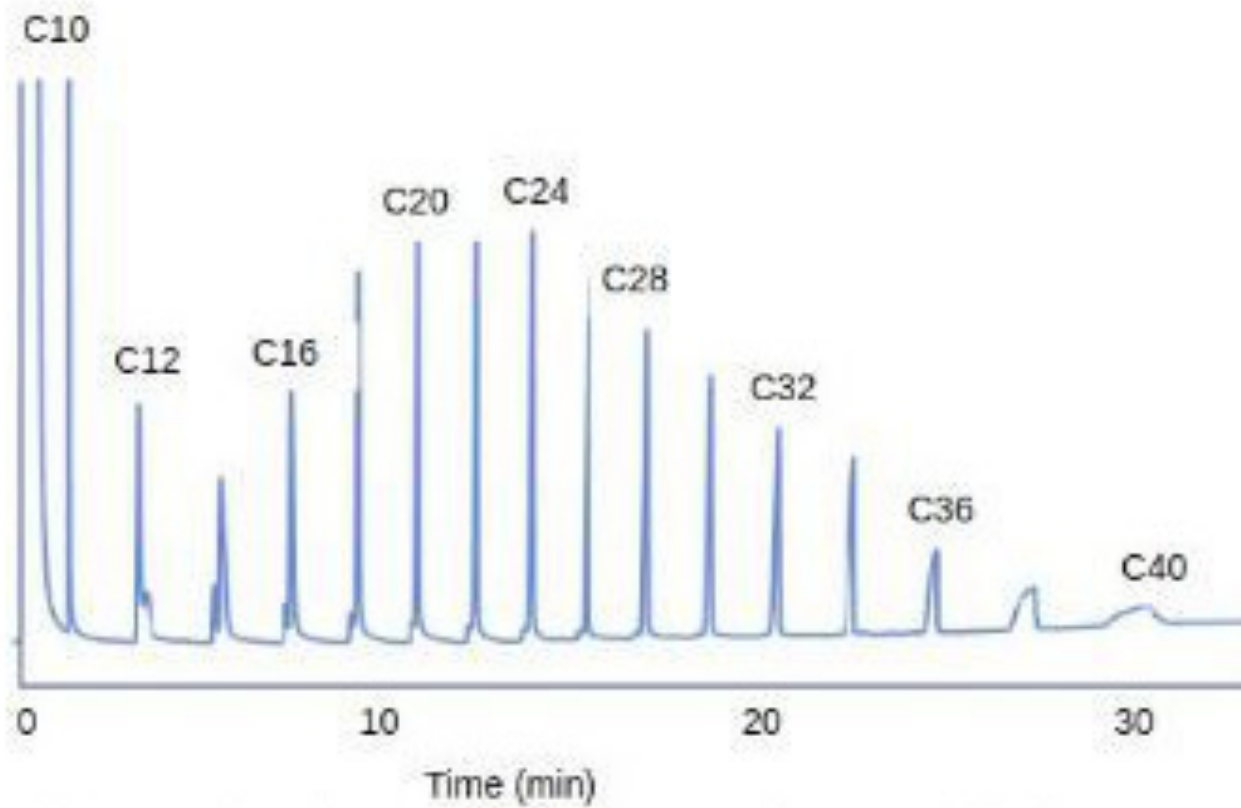
# Varying Column Chemistry

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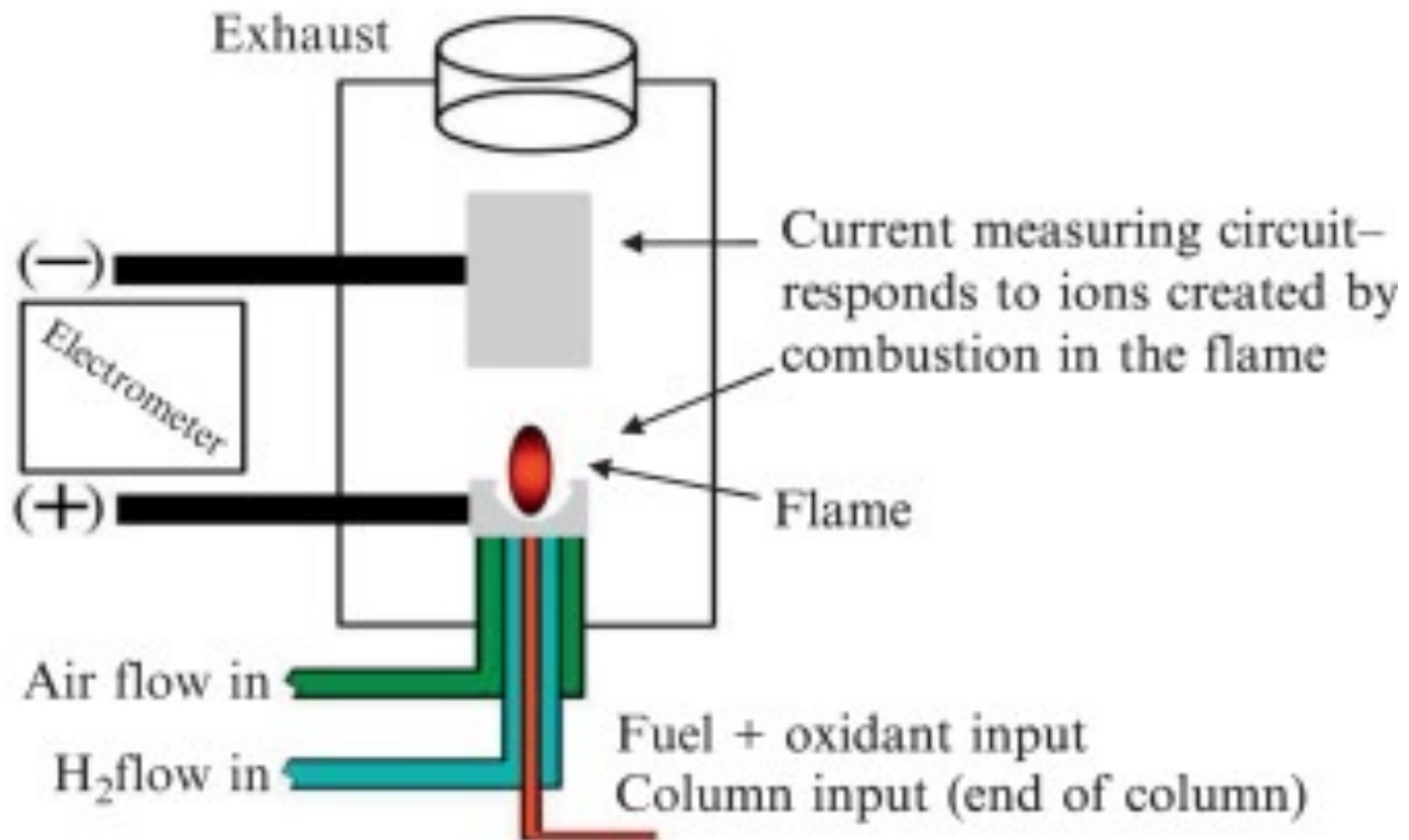
# Example Chromatogram

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# Flame Ionization Detector - FID

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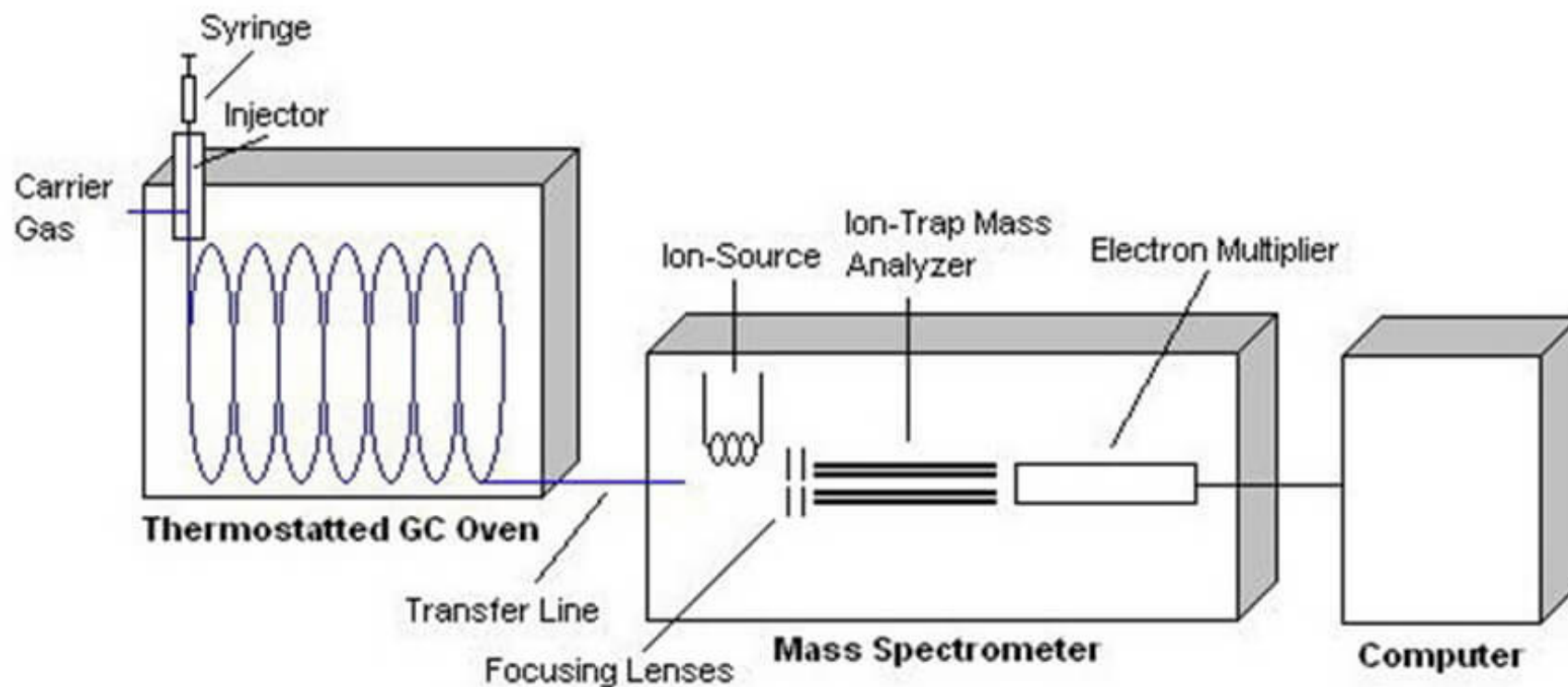
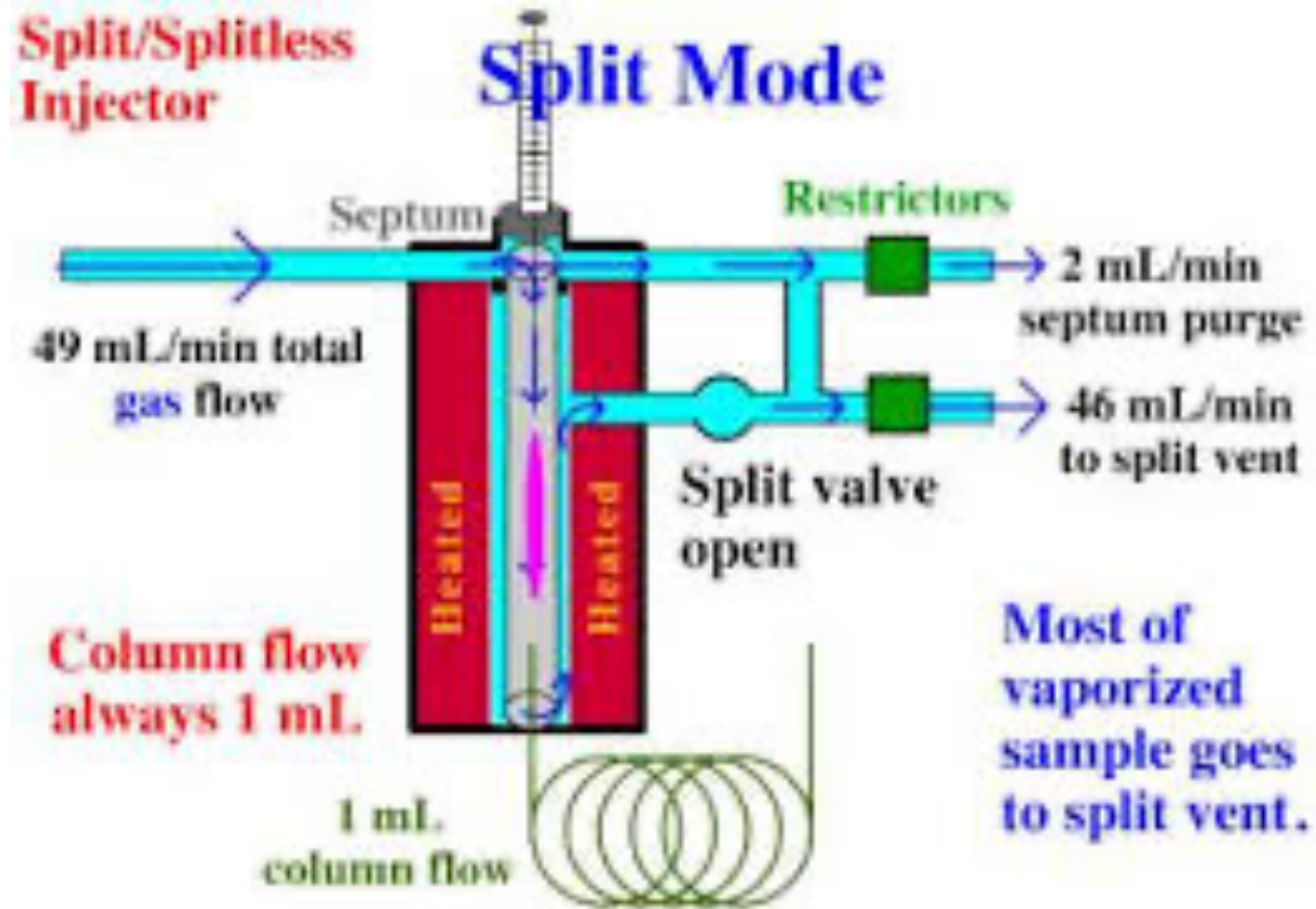


Figure 1 – Diagram of Gas Chromatograph with Mass Spectrometer attached

# Split Mode Injection

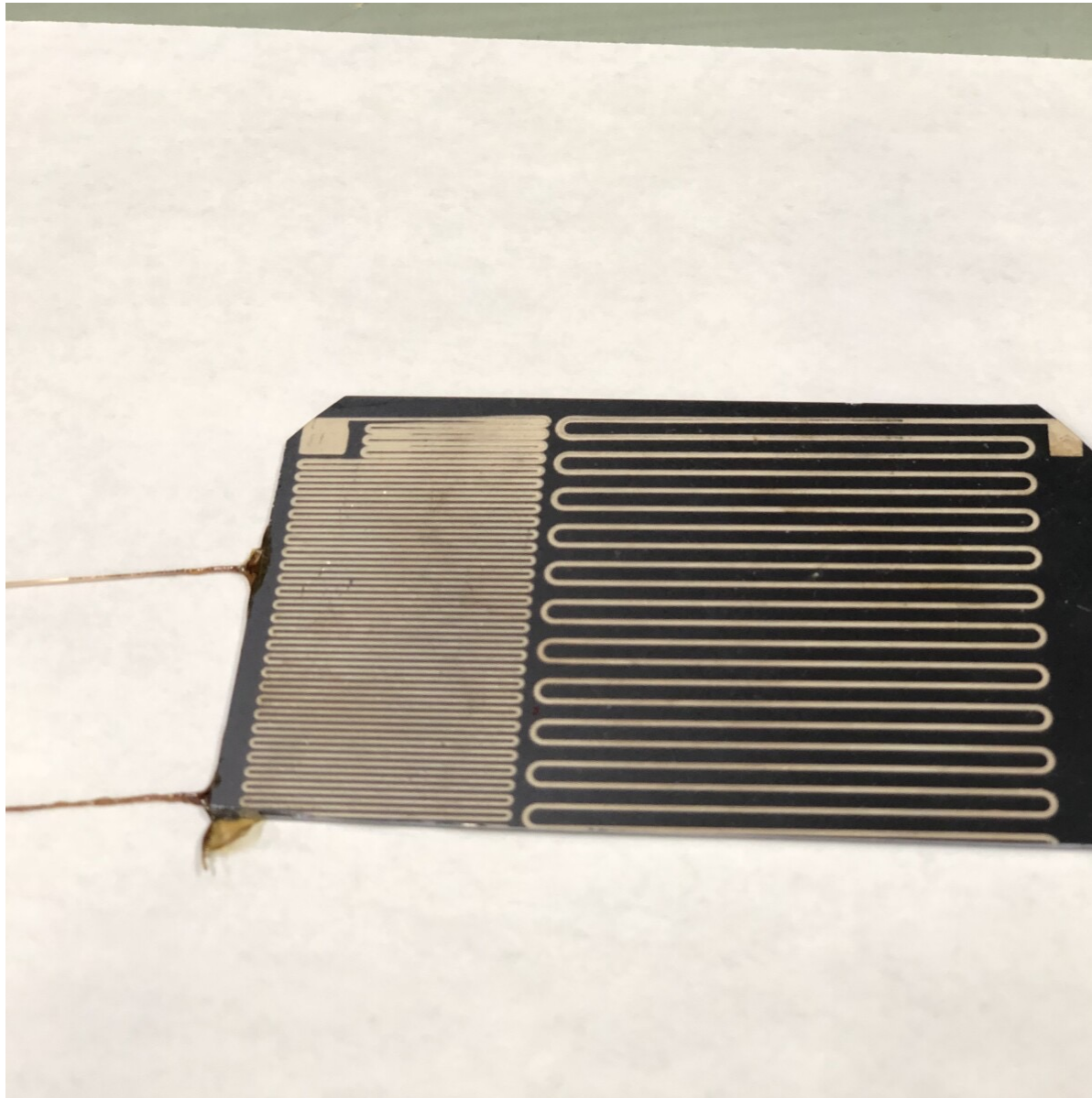
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# Crazy Column Configuration

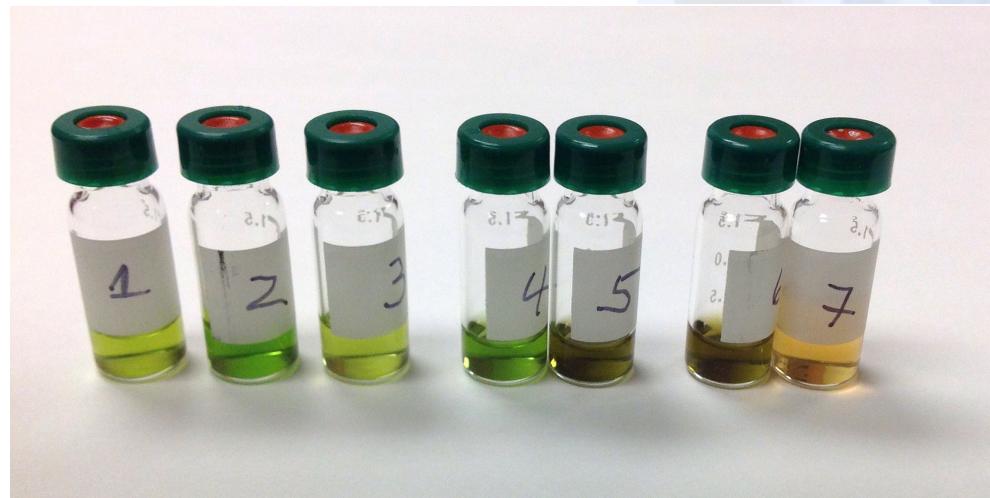
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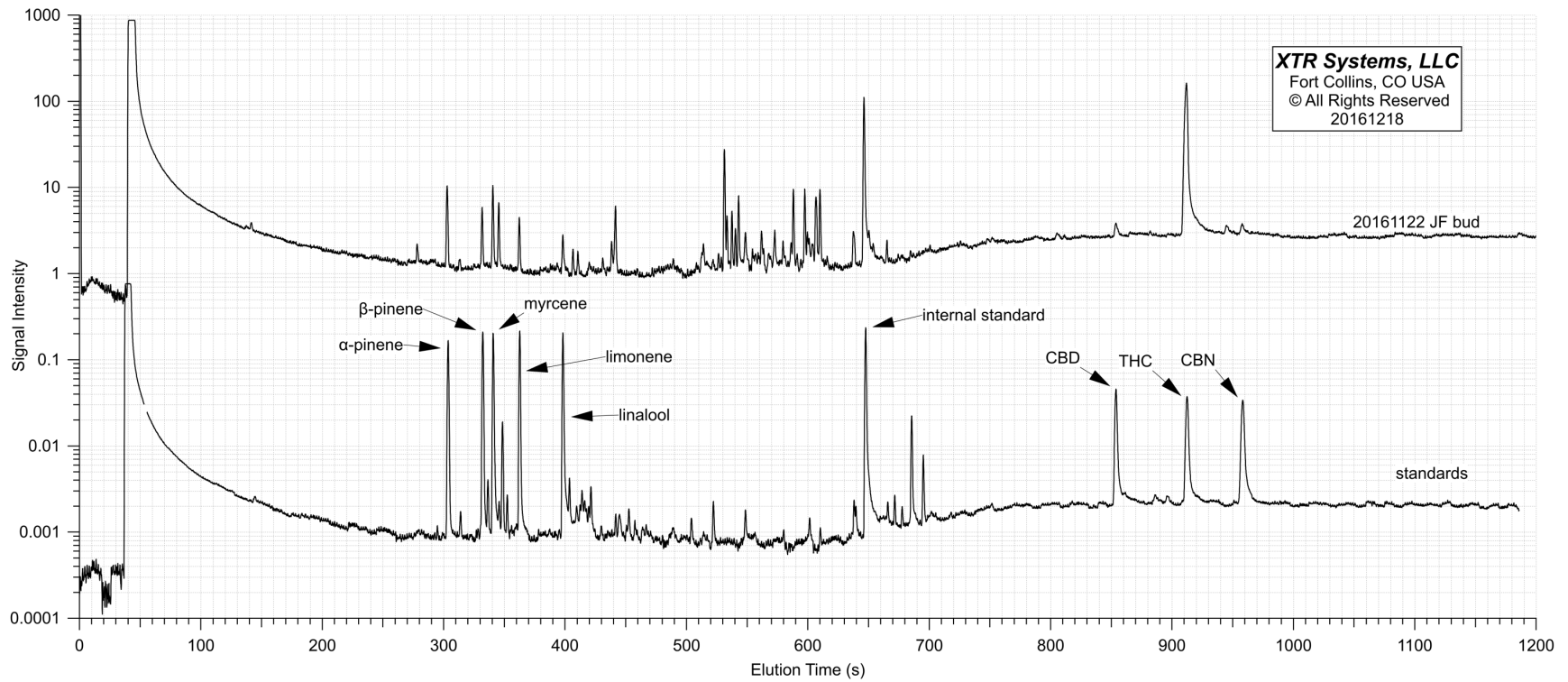
# Sample Prep – Vials and Injection Vials

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# Standards and Sample

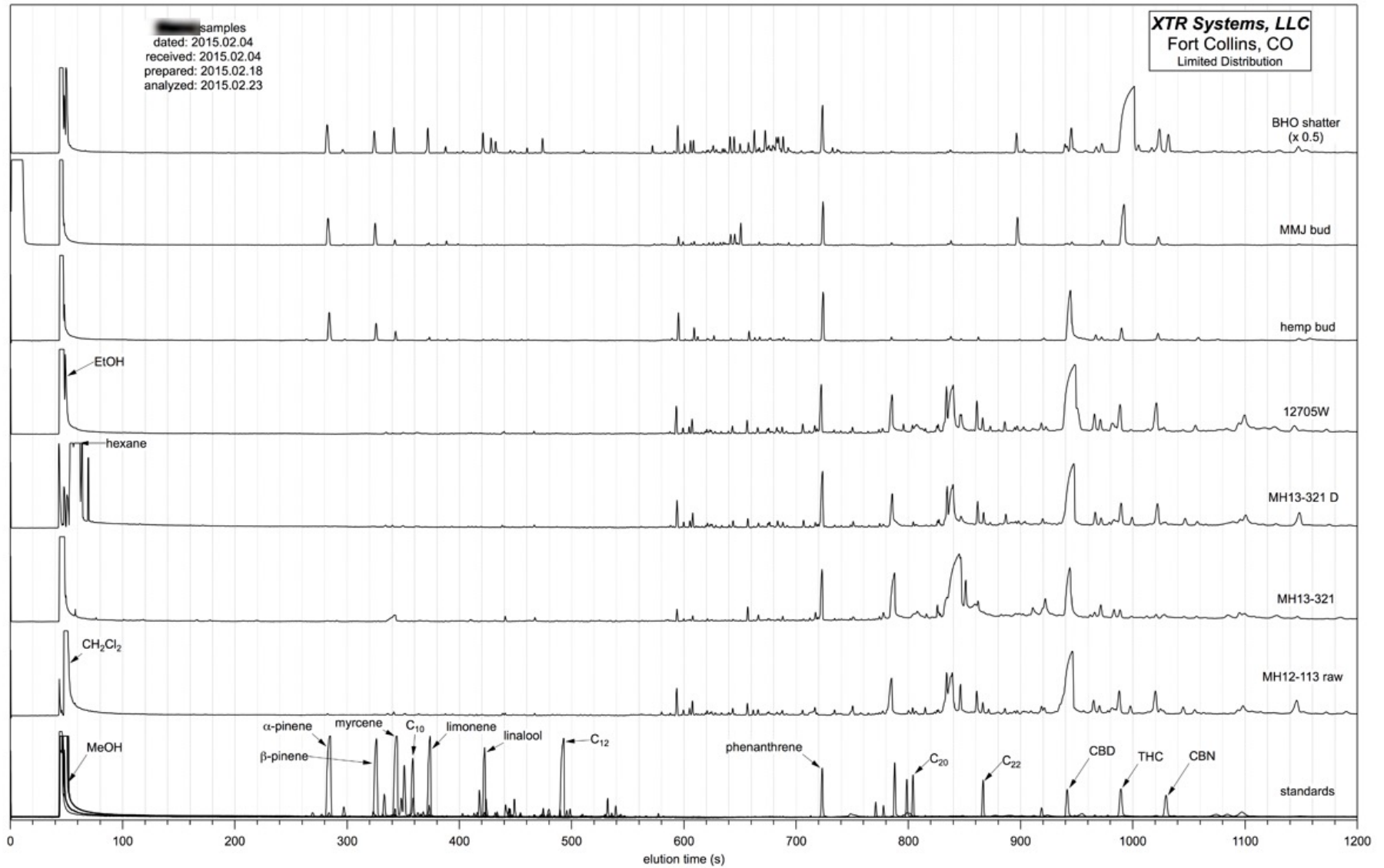
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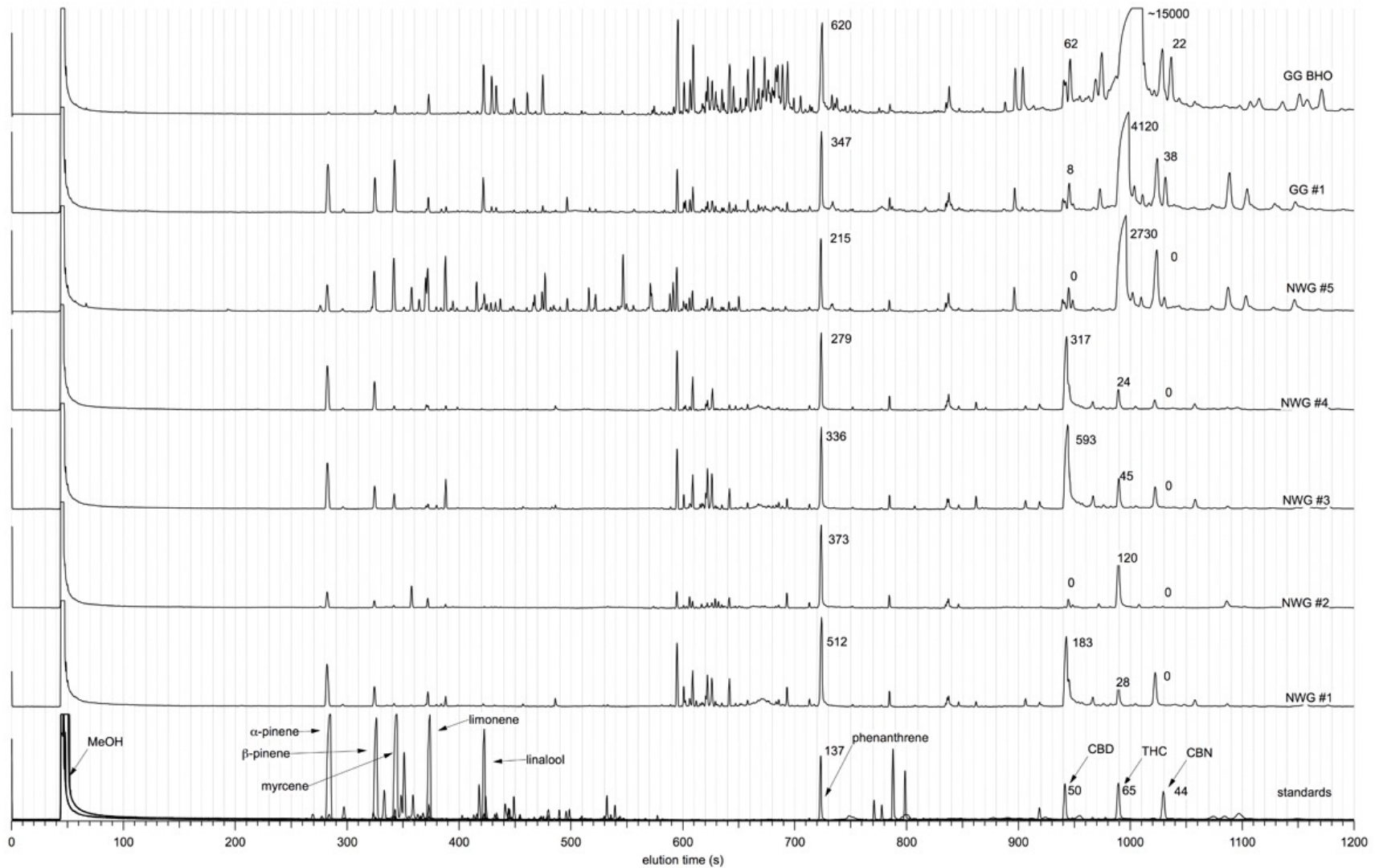
# More Samples

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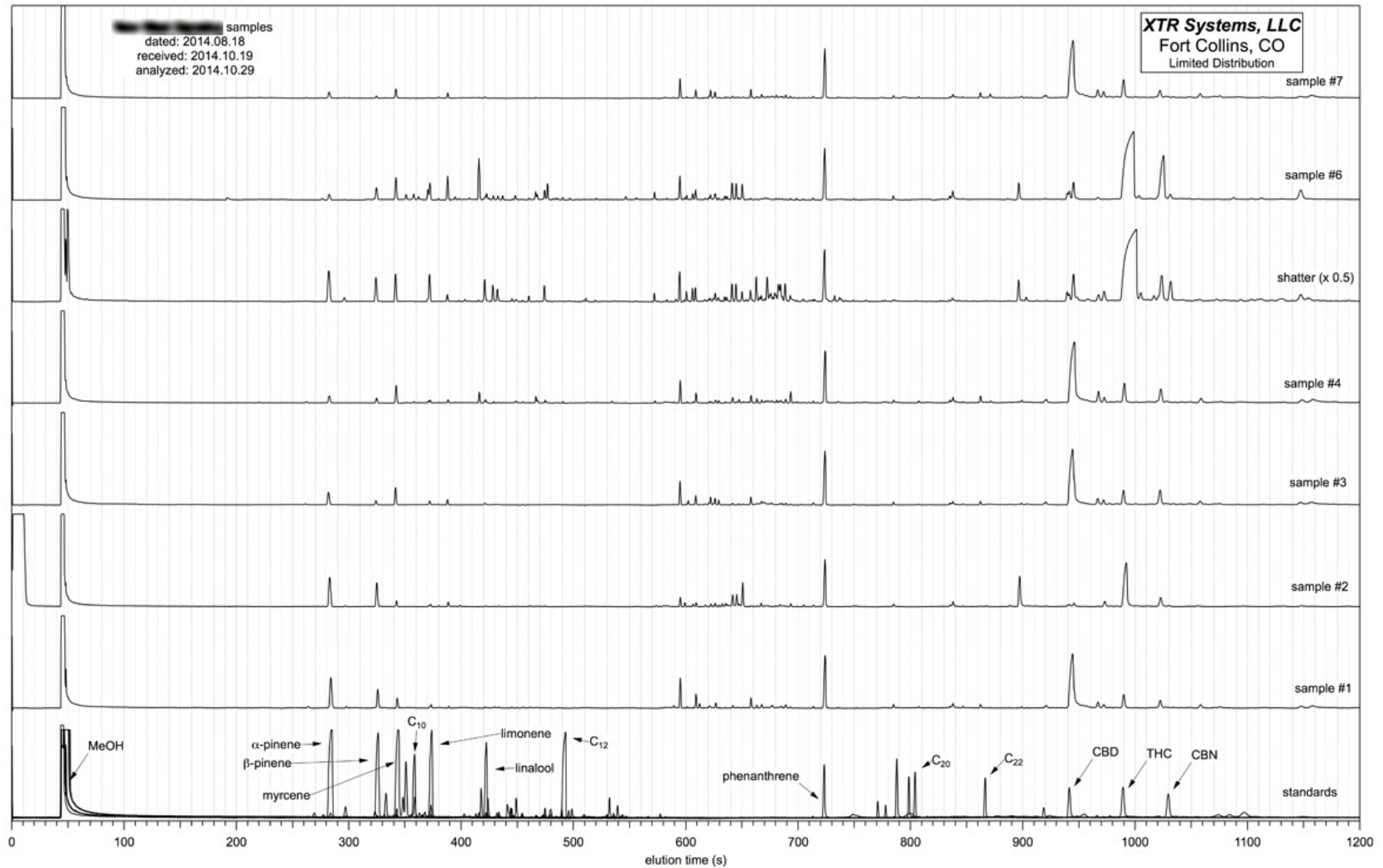
# Even More Samples

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# Even More Samples

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# Summary Results Table

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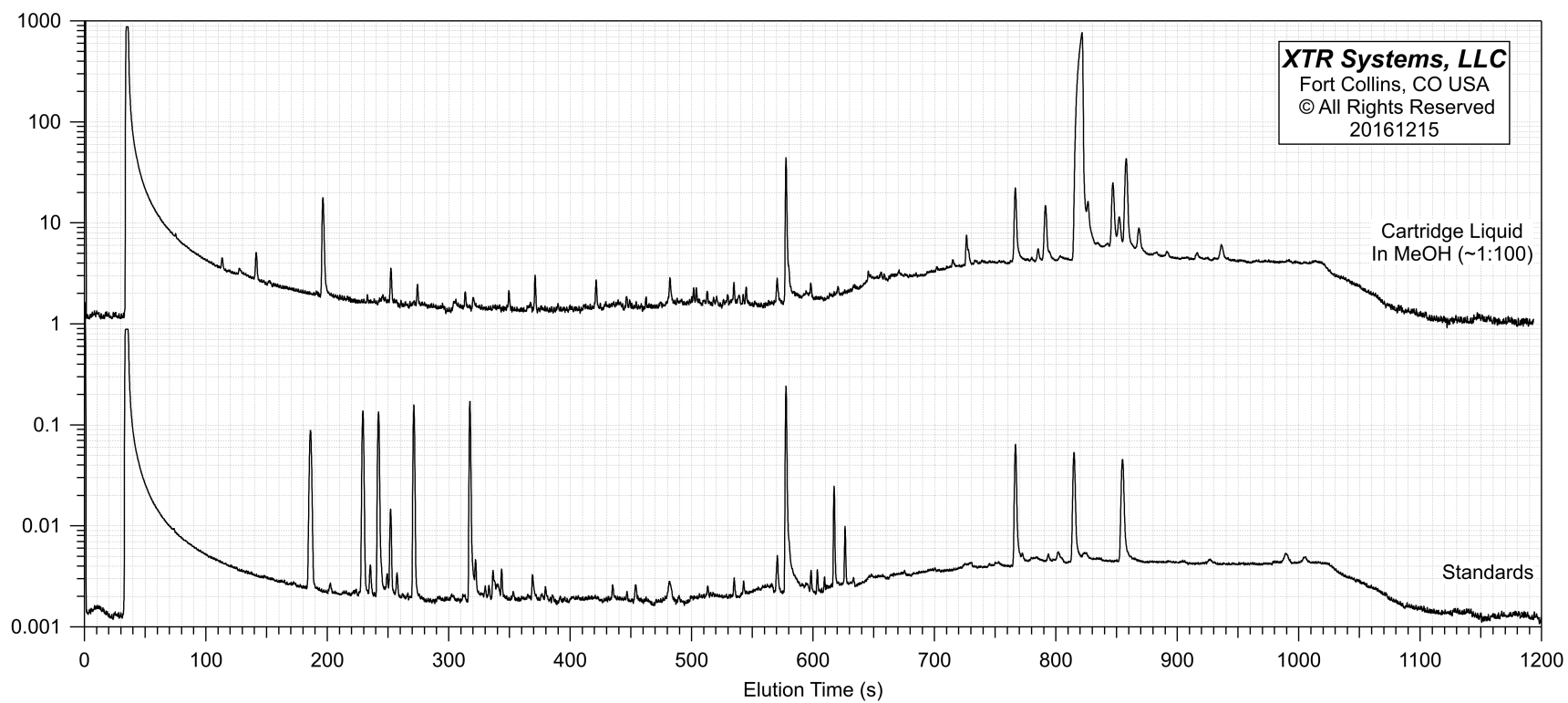
██████████ samples  
dated: 2014.08.18  
received: 2014.10.19  
analyzed: 2014.10.29

**XTR Systems, LLC**  
Fort Collins, CO  
Limited Distribution

	a-pinene	b-pinene	myrcene	limonene	linalool	CBD	THC	CBN	moisture
sample #7	0.04%	0.01%	0.05%	0.00%	0.00%	3.95%	0.22%	0.07%	n/a
sample #6	0.03%	0.08%	0.16%	0.07%	0.05%	0.05%	13.80%	1.63%	n/a
sample #4	0.04%	0.02%	0.11%	0.02%	0.02%	4.44%	0.20%	0.13%	n/a
sample #3	0.08%	0.02%	0.10%	0.02%	0.01%	2.58%	0.11%	0.13%	n/a
sample #2	0.49%	0.27%	0.04%	0.01%	0.01%	0.03%	1.84%	0.10%	n/a
sample #1	0.37%	0.13%	0.05%	0.01%	0.01%	2.33%	0.11%	0.05%	n/a
BHO - shatter	0.85%	0.42%	0.48%	0.42%	0.24%	0.08%	42.06%	0.79%	0.0%

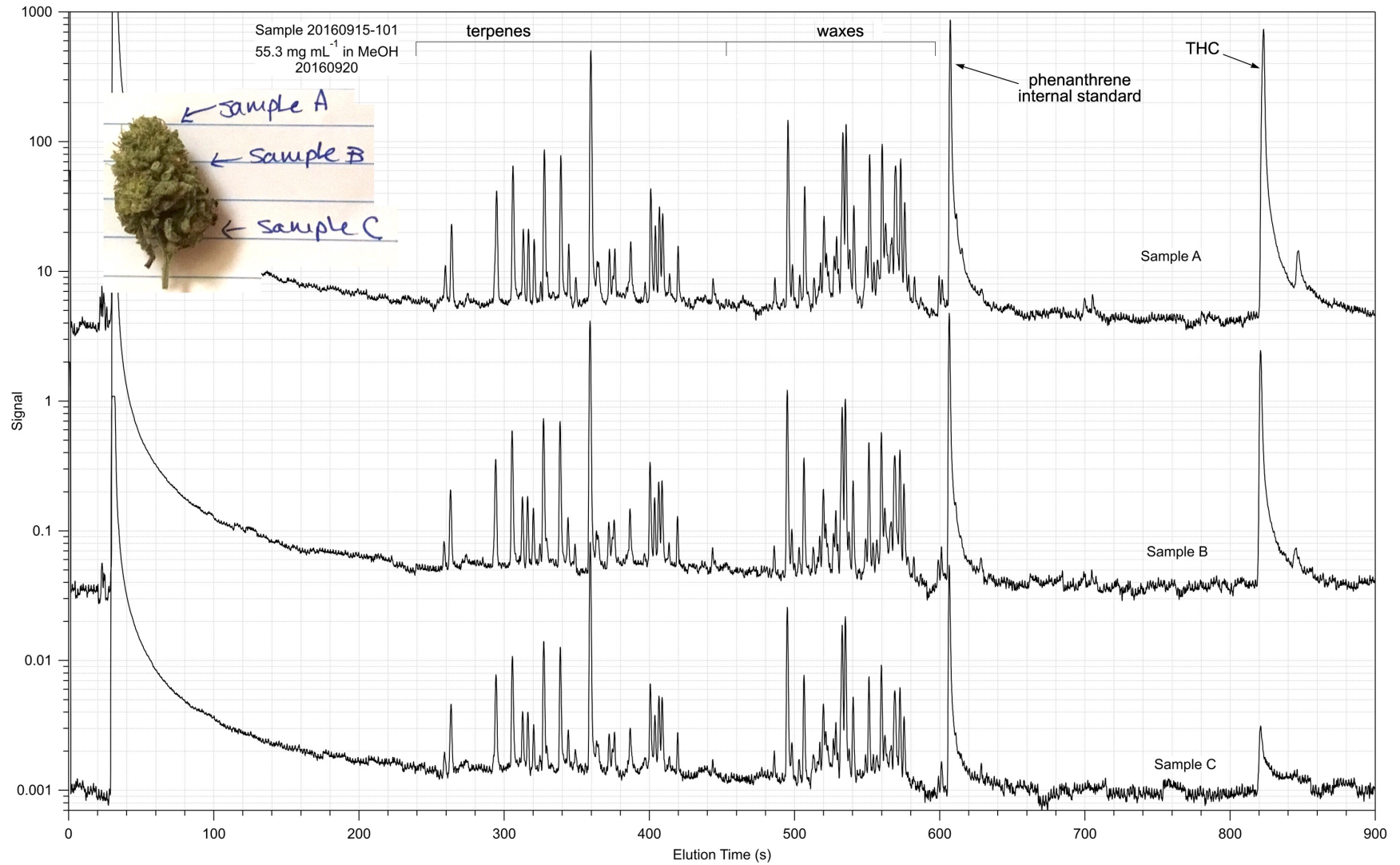
# Vape Cartridge Analysis

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# Spatial Distribution in Flower/Bud

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# Example Rigorous Analysis

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