

Polycyclic Aromatic Hydrocarbon Analysis

This method is suitable using the Shimadzu QP-2010 GC/MS to identify and quantitate PAH's at low levels. The Environmental Protection Agency requires that this analysis be performed in compliance with the protocol specified in the United States Federal Register 40 CFR and this method is not meant to replace that criteria.

The following is an example of the instrument setup and the performance achieved under these conditions in accordance with Method 525.2 and 8270. For specific information to customize your application, contact your local Shimadzu representative or our corporate technical support staff.

Experimental

Equipment

This analysis was performed using the Shimadzu QP-2010 Mass Spectrometer, the standard GC-2010 Gas Chromatograph with Advanced Flow Control, the AOC-20i auto injector and AOC-20s with 150-sample capacity.

Using the standard SPL split/splitless injection port on the GC-2010 as a gas flow splitter, the method was performed with a Shimadzu 3.4mm. id. liner. These results were obtained using a 30m X 0.25mm X 0.25 um column from Restek Corporation.

Standards

The Standards were purchased from AccuStandards Inc. (New Haven, CT). The sample of 0.5ug/ml was diluted to 0.0005ug/ml.

Mass Spectrometer

The QP-2010 method file setup specified that the mass filter was to be scanned and data acquired from mass 45 to mass 400. The scan rate was set to scan the chromatographic peaks 10 - 15 times for the narrowest chromatographic peak.

GC

The GC-2010 was set up with a multi-rate temperature profile and the Advanced Flow Control was programmed to provide a constant linear velocity from the column into the mass spectrometer ion source. The last peak eluted in less than 28 minutes.

QC

After the QP-2010 was tuned using the Automatic tuning function, the instrument passed all ion criteria requirements.

Results

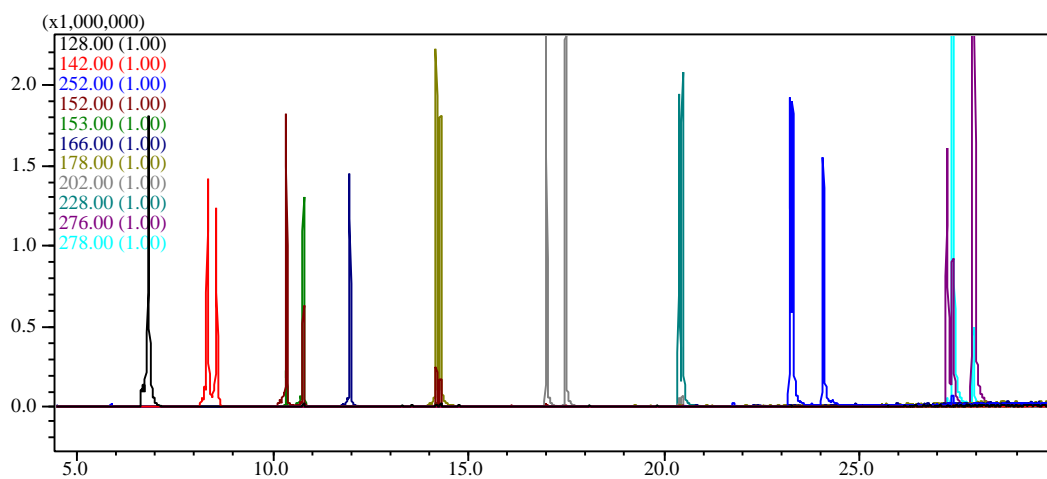


Figure 1: Chromatogram of 500ppt calibration standard on the GCMS-QP2010.

Quality Control Data:

500ppt standard response data on GCMS-QP2010

ID#	Compound Name	Retention Time	m/z	Area
1	Naphthalene	6.831	128.05	5827478
2	Naphthalene, 2-methyl-	8.344	142.05	3591310
3	Naphthalene, 1-methyl-	8.566	142.05	2948961
4	Acenaphthylene	10.352	152	3472507
5	Acenaphthene	10.795	153	2691691
6	Fluorene	11.986	166	2955043
7	Phenanthrene	14.19	178	4387891
8	Dibenzo[a,e]7,8-diazabicyclo[2.2.2]octa-2,5-diene	14.291	178	4068597
9	Fluoranthene	17.002	202	4913734
10	Pyrene	17.49	202	5308475
11	Triphenylene	20.378	228	4193956
12	Triphenylene	20.466	228	5029738
13	Benzo[a]pyrene	22.784	252	3027939
14	Benzo[k]fluoranthene	22.835	252	3027939
	Benzo[k]fluoranthene	23.411	252	5344843
16	Indeno[1,2,3-cd]pyrene	25.539	275.95	9579917
17	Dibenz[a,h]anthracene	25.615	277.95	2890061
18	Dibenzo[def,mno]chrysene	26.021	275.95	6821668

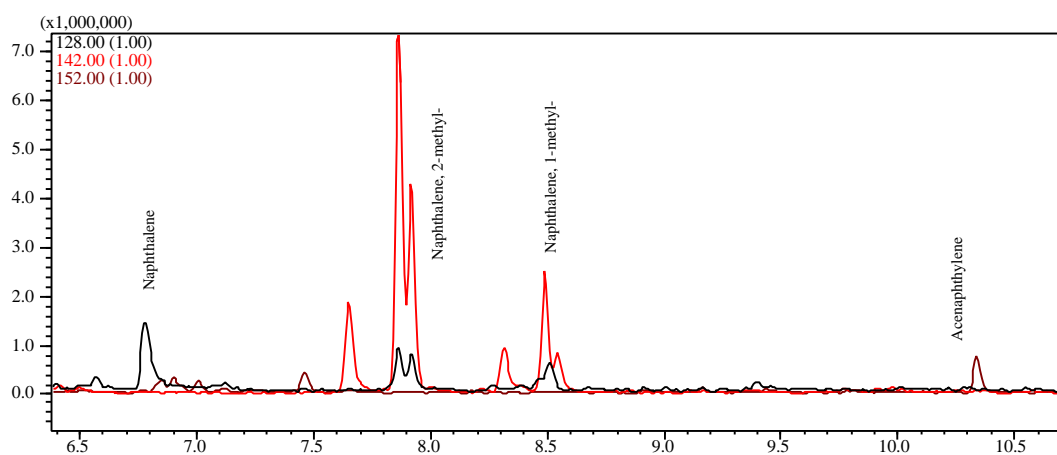


Figure 2: 50ppt concentration chromatogram of the Naphthalene compounds and Acenaphthylene.

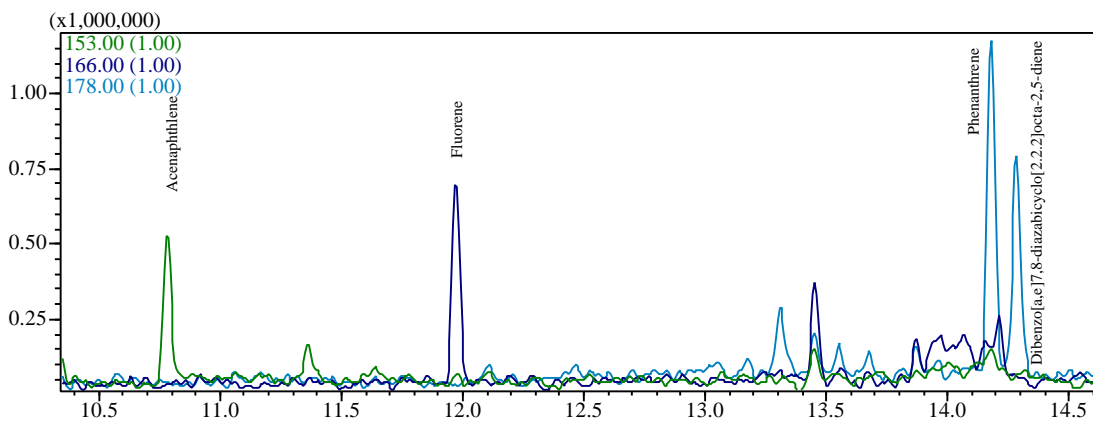


Figure 3: Shows the chromatography of the Acenaphthylene, Fluorene, Phenanthrene, and Dibenzo[a,e]7,8-diazabicyclo[2.2.2]octa-2,5-diene at the 50ppt concentration level.

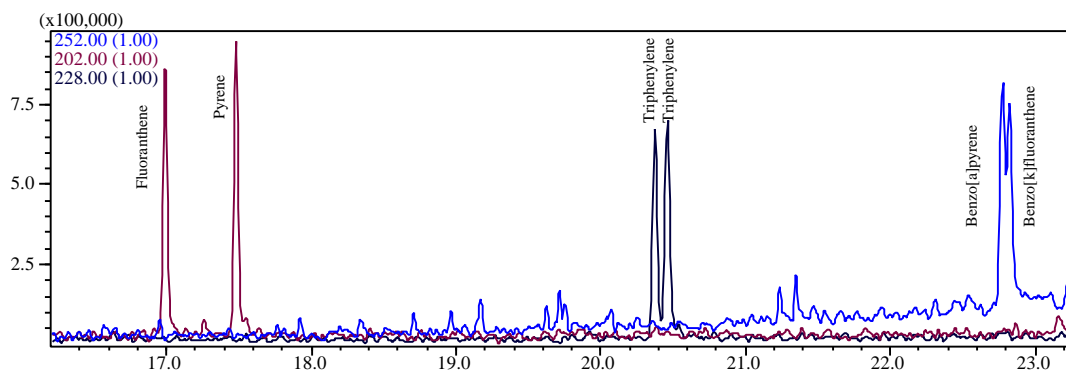


Figure 4: Shows the chromatography of the Fluoranthene, Pyrene, Triphenylene, Benzo[a]pyrene and Benzo[k]fluoranthene at the 50ppt concentration level.

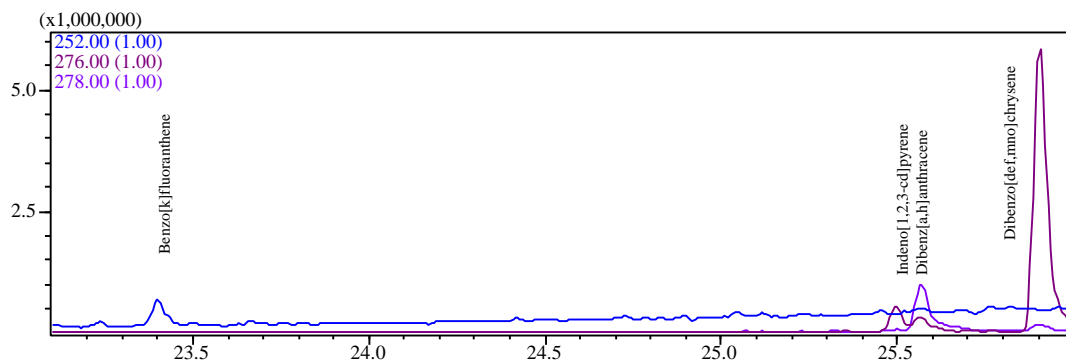


Figure 5: Shows the chromatography of the Benzo[k]fluoranthene, Indeno[1,2,3-cd]pyrene, Dibenz[a,h]anthracene and Dibenzo[def,mno]chrysene at the 50ppt concentration level.