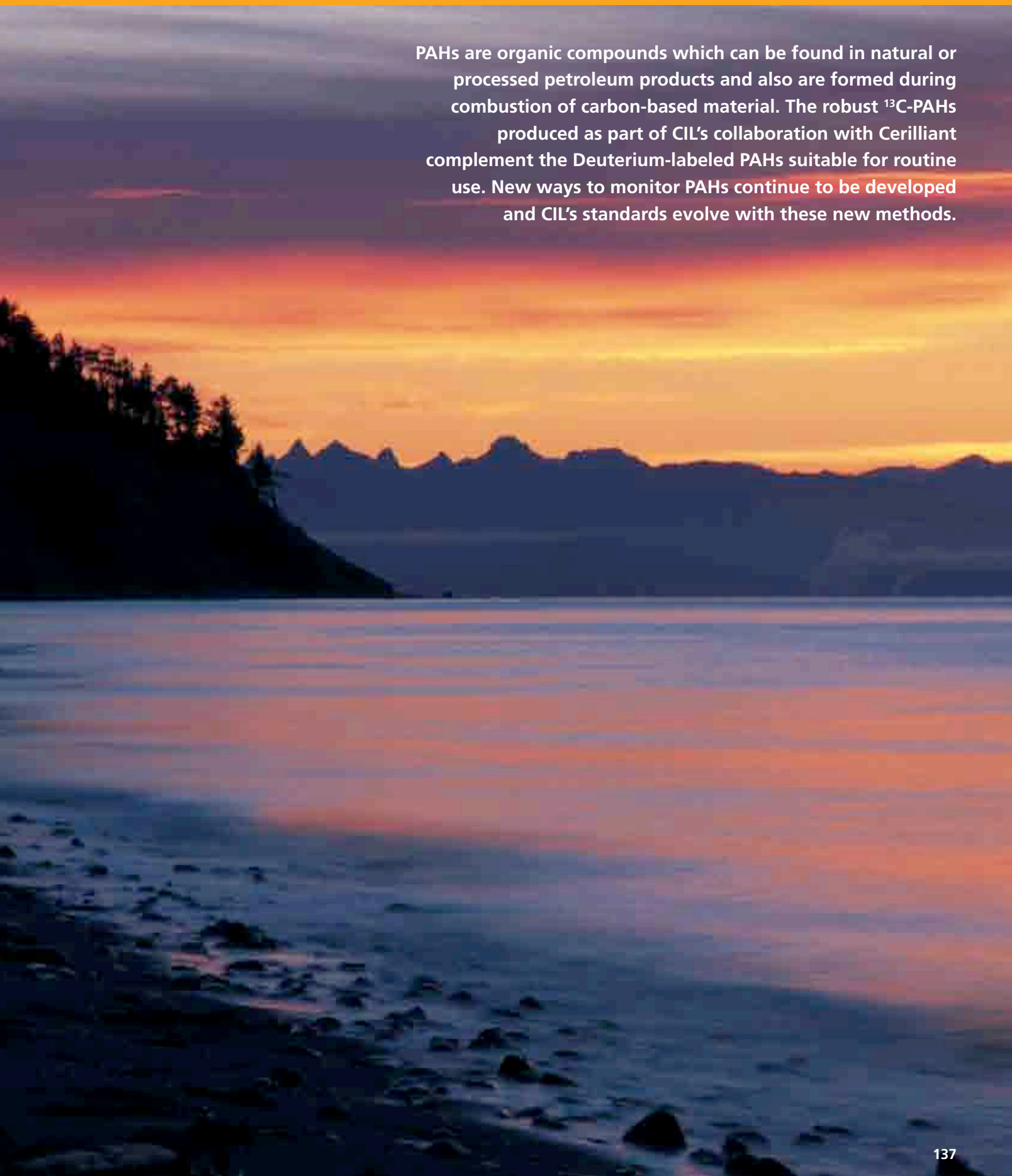


PAHs are organic compounds which can be found in natural or processed petroleum products and also are formed during combustion of carbon-based material. The robust ^{13}C-PAHs produced as part of CIL's collaboration with Cerilliant complement the Deuterium-labeled PAHs suitable for routine use. New ways to monitor PAHs continue to be developed and CIL's standards evolve with these new methods.

^{13}C-Labeled Polycyclic Aromatic Hydrocarbon (PAH) Standards

Cambridge Isotope Laboratories, in cooperation with Cerilliant Corporation, is pleased to offer ^{13}C-labeled Polycyclic Aromatic Hydrocarbons (PAHs), as a superior alternative to deuterated standards. Although CIL has traditionally produced high-quality deuterated PAH analogs, some analysts have observed back-exchange of proton for deuterium under harsh extraction conditions and in certain matrices. If precise quantitation is required, or complete recovery information is needed, the non-exchangeable ^{13}C isotope label is the right standard to use.

Deuterium Back-Exchange

While analysts have been using Deuterated PAH standards for years, labile deuterons are susceptible to back-exchange. The phenomenon is particularly likely to occur in acidic or catalytic matrices, when the importance of a reliable internal standard
is greatest.

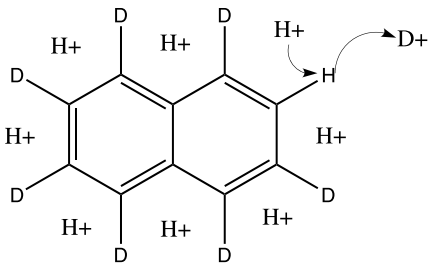
Deuterium-labeled PAH Metabolites are even more susceptible to the phenomena of back-exchange and loss of protons/ deuterons
in the mass spectrometer.

Similiar Mass Spectra

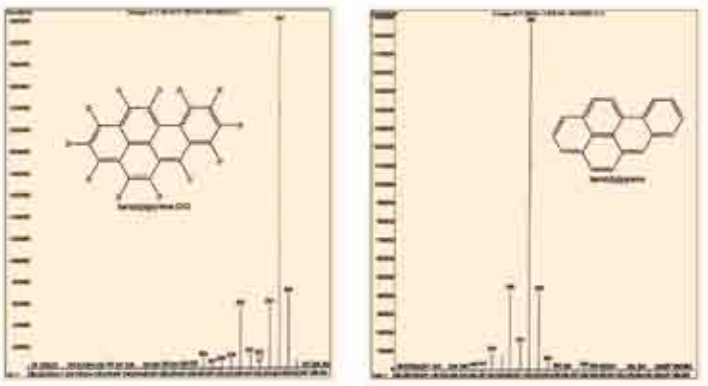
Even at lower voltages the parent ion loses a considerable number of protons or deuterons. Mass spectra of ^{13}C PAHs will show a succession of proton losses (M-1, M-2, M-3, M-4 etc., similar to native PAHs), while mass spectra of Deuterated PAHs will show
a succession of deuteron losses (M-2,M-4,M-6, M-8, etc.).

In the chromatogram for the deuterated Benzo[*a*]pyrene, the proton losses at M-2,M-4, etc. are supplemented with proton losses of M-1, M-3, etc. This represents a loss of deuterons from incompletely deuterated species. As a result, the profile of the deuterated material does not correspond exactly to that of the unlabeled material. ^{13}C-labeled Benzo[*a*]

Naphthalene-D_8 Deuterium-Exchange



Deuterated PAH Mass Spectra differ from Unlabeled Mass Spectra

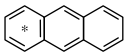
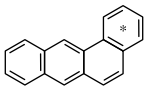
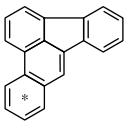
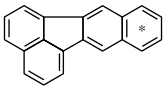
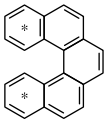
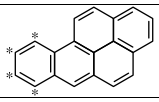
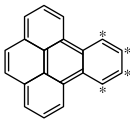
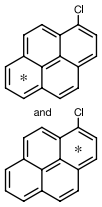
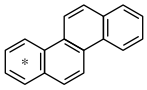
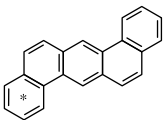
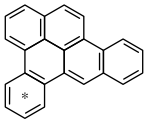


ISO Accreditation

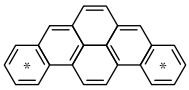
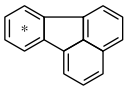
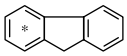
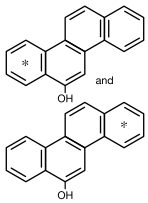
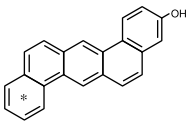
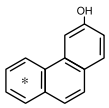
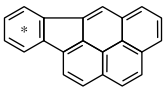
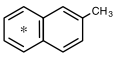
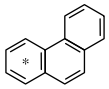
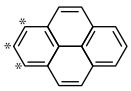
Adding to our list of firsts in the field of PAH reference standards, CIL is pleased to announce the availability of the first ^{13}C PAH
parent compound standards manufactured under **ISO/ IEC 17025 and ISO Guide 34 accreditation**.

Cerilliant Corporation, CIL's longtime collaborator for ^{13}C PAH standards, has received accreditation under ISO Guide 34 for Reference Material Producers, as well as ISO/IEC 17025 for Testing and Calibration Laboratories. These two new accreditations provide

^{13}C-Labeled Polycyclic Aromatic Hydrocarbon (PAH) Standards

Catalog #	Compound		Concentration	Amount
CLM-1643-1.2	**Acenaphthene ($^{13}C_6$,99%)**		100 ± 10 µg/mL in Nonane	**1.2 mL**
CLM-2477-1.2	**Acenaphthylene ($^{13}C_6$,99%)**		100 ± 10 µg/mL in Nonane	**1.2 mL**
CLM-1333-1.2	**Anthracene ($^{13}C_6$,99%)**		100 ± 10 µg/mL in Nonane	**1.2 mL**
CLM-3602-1.2	**Benz[*a*]anthracene ($^{13}C_6$,99%)**		100 ± 10 µg/mL in Nonane	**1.2 mL**
CLM-3599-1.2	**Benzo[*b*]fluoranthene ($^{13}C_6$,99%)**		100 ± 10 µg/mL in Nonane	**1.2 mL**
CLM-3756-1.2	**Benzo[*k*]fluoranthene ($^{13}C_6$,99%)**		100 ± 10 µg/mL in Nonane	**1.2 mL**
CLM-1364-1.2	**Benzo[*g,h,i*]perylene ($^{13}C_{12}$,99%)**		100 ± 10 µg/mL in Nonane	**1.2 mL**
CLM-2722-1.2	**Benzo[*a*]pyrene ($^{13}C_4$,99%)**		100 ± 10 µg/mL in Nonane	**1.2 mL**
CLM-6170-1.2	**Benzo[*e*]pyrene (9,10,11,12-$^{13}C_4$,99%)**		100 ± 10 µg/mL in Nonane	**1.2 mL**
NEW CLM-8267-1.2	**1-Chloropyrene (mix of ring labeling) ($^{13}C_6$,99%)**		50 ± 5 µg/mL in Nonane	**1.2 mL**
CLM-3757-1.2	**Chrysene ($^{13}C_6$,99%)**		100 ± 10 µg/mL in Nonane	**1.2 mL**
CLM-3598-1.2	**Dibenz[*a,h*]anthracene ($^{13}C_6$,99%)**		100 ± 10 µg/mL in Nonane	**1.2 mL**
CLM-3835-1.2	**Dibenzo[*a,e*]pyrene ($^{13}C_6$,99%)**		100 ± 10 µg/mL in Nonane	**1.2 mL**

^{13}C-Labeled Polycyclic Aromatic Hydrocarbon (PAH) Standards

Catalog #	Compound		Concentration	Amount
CLM-3774-A	**Dibenzo[*a,i*]pyrene ($^{13}C_{12}$,99%)**		50 ± 5 µg/mL in Nonane	**1.2 mL**
CLM-3597-1.2	**Fluoranthene ($^{13}C_6$,99%)**		100 ± 10 µg/mL in Nonane	**1.2 mL**
CLM-3596-1.2	**Fluorene ($^{13}C_6$,99%)**		100 ± 10 µg/mL in Nonane	**1.2 mL**
CLM-4860-1.2	**6-Hydroxychrysene (mix of ring labeling) ($^{13}C_6$,99%)**		50 ± 5 µg/mL in Acetonitrile	**1.2 mL**
NEW CLM-6890-1.2	**3-Hydroxydibenz[*a,h*]anthracene ($^{13}C_6$,99%)**		50 ± 5 µg/mL in Acetonitrile	**1.2 mL**
CLM-4859-1.2	**3-Hydroxyphenanthrene (ring-$^{13}C_6$,99%)**		50 ± 5 µg/mL in Acetonitrile	**1.2 mL**
CLM-3600-1.2	**Indeno[1,2,3-*cd*]pyrene ($^{13}C_6$,99%)**		100 ± 10 µg/mL in Nonane	**1.2 mL**
CLM-3621-1.2	**2-Methylnaphthalene ($^{13}C_6$,99%)**		100 ± 10 µg/mL in Nonane	**1.2 mL**
CLM-1332-1.2	**Naphthalene ($^{13}C_6$,99%)**		100 ± 10 µg/mL in Nonane	**1.2 mL**
CLM-2451-1.2	**Phenanthrene ($^{13}C_6$,99%)**		100 ± 10 µg/mL in Nonane	**1.2 mL**
CLM-3601-1.2	**Pyrene (1,2,3-$^{13}C_3$,99%)**		100 ± 10 µg/mL in Nonane	**1.2 mL**

Deuterium Labeled Polycyclic Aromatic Hydrocarbon (PAH) Standards

	Catalog #	Compound	Formula	Concentration	Amount
	DLM-108-1.2	**Acenaphthene (D_{10},98%)**	$C_{12}D_{10}$	200 µg/mL in Isooctane	1.2 mL
	DLM-108-0.1			Neat	0.1 g
	DLM-108-1			Neat	1 g
	DLM-108-5			Neat	5 g
	DLM-2204-1.2	**Acenaphthylene (D_8,98%)**	$C_{12}D_8$	200 µg/mL in Isooctane	1.2 mL
	DLM-2204-0.1			Neat	0.1 g
	DLM-849-0.1	**Acridine (D_9,98%)**	$C_{13}D_9N$	Neat	0.1 g
	DLM-849-0.5			Neat	0.5 g
	DLM-102-1.2	**Anthracene (D_{10},98%)**	$C_{14}D_{10}$	200 µg/mL in Isooctane	1.2 mL
	DLM-102-1			Neat	1 g
	DLM-102-5			Neat	5 g
	DLM-610-1.2	**Benz[*a*]anthracene (D_{12},98%)**	$C_{18}D_{12}$	200 µg/mL in Isooctane	1.2 mL
	DLM-610-0.1			Neat	0.1 g
	DLM-2136-1.2	**Benzo[*b*]fluoranthene (D_{12},98%)**	$C_{20}D_{12}$	200 µg/mL in Isooctane	1.2 mL
	DLM-2136-0.01			Neat	0.01 g
	DLM-1923-1.2	**Benzo[*k*]fluoranthene (D_{12},98%)**	$C_{20}D_{12}$	200 µg/mL in Isooctane	1.2 mL
	DLM-1923-0.01			Neat	0.01 g
	DLM-2135-1.2	**Benzo[*g,h,i*]perylene (D_{12},98%)**	$C_{22}D_{12}$	200 µg/mL in Isooctane	1.2 mL
	DLM-2135-0.01			Neat	0.01 g
	DLM-258-1.2	**Benzo[*a*]pyrene (D_{12},98%)**	$C_{20}D_{12}$	200 µg/mL in Isooctane	1.2 mL
	DLM-258-0.01			Neat	0.01 g
	DLM-258-0.05			Neat	0.05 g
	DLM-258-0.1			Neat	0.1 g
	DLM-257-1.2	**Benzo[*e*]pyrene (D_{12},98%)**	$C_{20}D_{12}$	200 µg/mL in Isooctane	1.2 mL
	DLM-257-0.01			Neat	0.01 g
NEW	DLM-2005-1.2	**2-Chloronaphthalene (D_7,98%)**	$C_{10}D_7Cl$	100 µg/mL in Nonane	1.2 mL
	DLM-261-1.2	**Chrysene (D_{12},98%)**	$C_{18}D_{12}$	200 µg/mL in Toluene-D_8	1.2 mL
	DLM-261-0.1			Neat	0.1 g
	DLM-261-1			Neat	1 g
	DLM-2715-1.2	**Coronene (D_{12},97%)**	$C_{24}D_{12}$	200 µg/mL in Benzene	1.2 mL
NEW	DLM-2715-0.01			Neat	0.1 g
	DLM-2715-0.1			Neat	1 g
	DLM-3843-1.2	**Dibenz[*a,j*]acridine (D_{13},98%)**	$C_{21}D_{13}N$	50 µg/mL in Toluene-D_8	1.2 mL
	DLM-677-1.2	**Dibenz[*a,h*]anthracene (D_{14},98%)**	$C_{22}D_{14}$	200 µg/mL in Toluene-D_8	1.2 mL
	DLM-677-0.1			Neat	0.1 g
	DLM-3740-1.2	**Dibenzo[*a,i*]pyrene (D_{14},98%)**	$C_{24}D_{14}$	200 µg/mL in Toluene-D_8	1.2 mL
	DLM-3841-1.2	**7H-Dibenzo[*c,g*]carbazole (D_{12},98%)**	$C_{20}D_{13}N$	50 µg/mL in Toluene-D_8	1.2 mL
	DLM-2845-1.2	**9,10-Dimethylanthracene (D_{14},98%)**	$C_{16}D_{14}$	50 µg/mL in Toluene-D_8	1.2 mL
	DLM-2852-1.2	**1,6-Dimethylnaphthalene (D_{12},98%)**	$C_{12}D_{12}$	50 µg/mL in Toluene-D_8	1.2 mL
	DLM-2854-1.2	**1,8-Dimethylnaphthalene (D_{12},98%)**	$C_{12}D_{12}$	50 µg/mL in Toluene-D_8	1.2 mL
	DLM-2853-1.2	**2,6-Dimethylnaphthalene (D_{12},98%)**	$C_{12}D_{12}$	50 µg/mL in Toluene-D_8	1.2 mL
	DLM-2140-1.2	**Fluoranthene (D_{10},98%)**	$C_{16}D_{10}$	200 µg/mL in Isooctane	1.2 mL
	DLM-2140-0.1			Neat	0.1 g
	DLM-1123-1.2	**Fluorene (D_{10},98%)**	$C_{13}D_{10}$	200 µg/mL in Isooctane	1.2 mL
	DLM-1123-0.1			Neat	0.1 g
	DLM-1123-1			Neat	1 g
	DLM-2148-1.2	**Indeno[1,2,3-*cd*]pyrene (D_{12},98%)**	$C_{22}D_{12}$	200 µg/mL in Isooctane	1.2 mL
	DLM-2148-0.01			Neat	0.01 g
	DLM-3842-1.2	**5-Methylchrysene (methyl-D_3,98%)**	$C_{19}D_3H_{11}$	50 µg/mL in Toluene-D_8	1.2 mL
	DLM-1607-1	**1-Methylnaphthalene (D_{10},98%)**	$C_{11}D_{10}$	Neat	1 g
	DLM-1322-1.2	**2-Methylnaphthalene (D_{10},98%)**	$C_{11}D_{10}$	200 µg/mL in Isooctane	1.2 mL
	DLM-365-1.2	**Naphthalene (D_8,99%)**	$C_{10}D_8$	200 µg/mL in Isooctane	1.2 mL
	DLM-365-1			Neat	1 g
	DLM-365-5			Neat	5 g
	DLM-365-10			Neat	10 g
NEW	DLM-3875-10	**Naphthalene (D_8,99.5%)**	$C_{10}D_8$	Neat	10 g
	DLM-3836-1.2	**5-Nitroacenaphthene (D_9,98%)**	$C_{12}D_9NO_2$	50 µg/mL in Toluene-D_8	1.2 mL
	DLM-4712-1.2	**9-Nitroanthracene (D_9,98%)**	$C_{14}D_9NO_2$	50 µg/mL in Toluene	1.2 mL

Deuterium Labeled Polycyclic Aromatic Hydrocarbon (PAH) Standards

Catalog #	Compound	Formula	Concentration	Amount
DLM-3839-1.2	**6-Nitrochrysene (D_{11},98%)**	$C_{18}D_{11}NO_2$	50 µg/mL in Toluene-D_8	1.2 mL
DLM-4711-1.2	**3-Nitrofluoranthene (D_9,98%)** (CP: 87%)	$C_{16}D_9NO_2$	50 µg/mL in Toluene-D_8	1.2 mL
DLM-3837-1.2	**2-Nitrofluorene (D_9,98%)**	$C_{13}D_9NO_2$	50 µg/mL in Toluene-D_8	1.2 mL
DLM-1528-1.2	**1-Nitropyrene (D_9,98%)**	$C_{18}D_9NO_2$	50 µg/mL in Toluene-D_8	1.2 mL
DLM-366-1.2	**Perylene (D_{12},98%)**	$C_{20}D_{12}$	200 µg/mL in Toluene-D_8	1.2 mL
DLM-366-0.1			Neat	0.1 g
DLM-366-1			Neat	1 g
DLM-371-1.2	**Phenanthrene (D_{10},98%)**	$C_{14}D_{10}$	200 µg/mL in Isooctane	1.2 mL
DLM-371-0.1			Neat	0.1 g
DLM-371-1			Neat	1 g
DLM-155-1.2	**Pyrene (D_{10},98%)**	$C_{16}D_{10}$	200 µg/mL in Isooctane	1.2 mL
DLM-155-0.1			Neat	0.1 g
DLM-155-0.5			Neat	0.5 g
DLM-450-1	***o*-Terphenyl (D_{14},98%)**	$C_6D_4(C_6D_5)_2$	Neat	1g
DLM-382-1.2	***p*-Terphenyl (D_{14},98)**	$C_6D_4(C_6D_5)_2$	200 µg/mL in Isooctane	1.2 mL
DLM-382-1			Neat	1 g
DLM-601-0.1	**Triphenylene (D_{12},98%)**	$C_{18}D_{12}$	Neat	0.1 g
DLM-601-1			Neat	1 g

Unlabeled Polycyclic Aromatic Hydrocarbon (PAH) Standards

	Catalog #	Compound	Formula	Concentration	Amount
	ULM-7413-1.2	**Acenaphthene**	$C_{12}H_{10}$	200 µg/mL in Isooctane	1.2 mL
	ULM-7422-1.2	**Acenaphthylene**	$C_{12}H_{8}$	200 µg/mL in Isooctane	1.2 mL
	ULM-7412-1.2	**Anthracene**	$C_{14}H_{10}$	200 µg/mL in Isooctane	1.2 mL
	ULM-2415-1.2	**Benz[*a*]anthracene**	$C_{18}H_{12}$	1 mg/mL in Methanol	1.2 mL
	ULM-2415-0.1			Neat	0.1 g
	ULM-2416-1.2	**Benzo[*b*]fluoranthene**	$C_{20}H_{12}$	1 mg/mL in Acetone	1.2 mL
	ULM-2416-0.1			Neat	0.1 g
NEW	ULM-8155-25	**Benzo[*c*]phenanthrene**	$C_{18}H_{12}$	Neat	25 mg
	ULM-2411-25	**Benzo[*j*]fluoranthene**	$C_{20}H_{12}$	Neat	25 mg
	ULM-2417-0.1	**Benzo[*k*]fluoranthene**	$C_{20}H_{12}$	Neat	0.1 g
	ULM-2418-1.2	**Benzo[*g,h,i*]perylene**	$C_{22}H_{12}$	1 mg/mL in Methylene chloride	1.2 mL
	ULM-2418-0.1			Neat	0.1 g
NEW	ULM-8717-1.2	**Benzo[*a*]pyrene**	$C_{20}H_{12}$	200 µg/mL in Isooctane	1.2 mL
	ULM-2412-0.1			Neat	0.1 g
	ULM-7423-1.2	**Benzo[*e*]pyrene**	$C_{20}H_{12}$	200 µg/mL in Isooctane	1.2 mL
NEW	ULM-8269-1.2	**9-Chloroanthracene**	$C_{14}H_{9}Cl$	50 µg/mL in Toluene	1.2 mL
NEW	ULM-8270-1.2	**9-Chlorophenanthrene**	$C_{14}H_{9}Cl$	50 µg/mL in Toluene	1.2 mL
NEW	ULM-8268-1.2	**1-Chloropyrene**	$C_{16}H_{9}Cl$	50 µg/mL in Toluene	1.2 mL
	ULM-7424-1.2	**Chrysene**	$C_{18}H_{12}$	200 µg/mL in Toluene	1.2 mL
	ULM-6576-1.2	**Coronene**	$C_{24}H_{12}$	200 µg/mL in Benzene	1.2 mL
	ULM-3884-1.2	**Dibenz[*a,j*]acridine**	$C_{21}H_{13}N$	50 µg/mL in Toluene	1.2 mL
	ULM-3884-25			Neat	25 mg
	ULM-2422-1.2	**Dibenz[*a,h*]anthracene**	$C_{22}H_{14}$	1 mg/mL in Methylene chloride	1.2 mL
	ULM-2422-0.1			Neat	0.1 g
	ULM-3885-1.2	**7H-Dibenzo[*c,g*]carbazole**	$C_{20}H_{13}N$	50 µg/mL in Toluene	1.2 mL
	ULM-6671-1.2	**Dibenzo[*a,e*]fluoranthene**	$C_{24}H_{14}$	200 µg/mL in Toluene	1.2 mL
	ULM-1226-0.01	**Dibenzo[*a,e*]pyrene**	$C_{24}H_{14}$	Neat	0.01 g
	ULM-1227-0.01	**Dibenzo[*a,h*]pyrene**	$C_{24}H_{14}$	Neat	0.01 g
	ULM-2423-1.2	**Dibenzo[*a,i*]pyrene**	$C_{24}H_{14}$	200 µg/mL in Toluene	1.2 mL
	ULM-1253-1.2	**Dibenzo[*a,l*]pyrene**	$C_{24}H_{14}$	200 µg/mL in Toluene	1.2 mL
	ULM-1253-25			Neat	25 mg
	ULM-7421-1.2	**Fluoranthene**	$C_{16}H_{10}$	200 µg/mL in Isooctane	1.2 mL
	ULM-7414-1.2	**Fluorene**	$C_{13}H_{10}$	200 µg/mL in Isooctane	1.2 mL
	ULM-6181-1.2	**1,8-Dimethylnaphthalene**	$C_{12}H_{12}$	50 µg/mL in Toluene	1.2 mL
	ULM-7271-1.2	**2,6-Dimethylnaphthalene**	$C_{12}H_{12}$	50 µg/mL in Toluene	1.2 mL
NEW	ULM-8464-1.2	**2-Hydroxyphenanthrene**	$C_{14}H_{10}O$	50 µg/mL in Toluene	1.2 mL
NEW	ULM-7446-1.2	**3-Hydroxyphenanthrene**	$C_{14}H_{10}O$	50 µg/mL in Acetonitrile	1.2 mL
	ULM-2426-1.2	**Indeno[1,2,3-*cd*]pyrene**	$C_{22}H_{12}$	1 mg/mL in Methylene chloride	1.2 mL
	ULM-2426-25			Neat	25 mg
	ULM-6235-1.2	**5-Methylchrysene**	$C_{19}H_{14}$	50 µg/mL in Toluene	1.2 ml
	ULM-7416-1.2	**2-Methylnaphthalene**	$C_{11}H_{10}$	200 µg/mL in Isooctane	1.2 mL
	ULM-7425-1.2	**Naphthalene**	$C_{10}H_{10}$	200 µg/mL in Isooctane	1.2 mL
	ULM-3883-1.2	**2-Nitrofluorene**	$C_{13}H_{9}NO_{2}$	50 µg/mL in Toluene	1.2 mL
	ULM-3978-1.2	**1-Nitropyrene**	$C_{18}H_{9}NO_{2}$	50 µg/mL in Toluene	1.2 mL
	ULM-7426-1.2	**Perylene**	$C_{20}H_{12}$	200 µg/mL in Isooctane	1.2 mL
	ULM-7427-1.2	**Phenanthrene**	$C_{14}H_{10}$	200 µg/mL in Isooctane	1.2 mL
	ULM-7417-1.2	**Pyrene**	$C_{16}H_{10}$	200 µg/mL in Toluene	1.2 mL
	ULM-7428-1.2	***p*-Terphenyl**	$C_{18}H_{14}$	200 µg/mL in Isooctane	1.2 mL

Isotope Labeled PAH Standard Mixtures

Catalog #	Compound	Amount
ES-4087	**^{13}C-Labeled EPA 16 PAH Cocktail**	1.2 mL in Nonane

Labeled	(µg/mL)
Acenaphthene ($^{13}C_6$,99%)	5
Acenaphthylene ($^{13}C_6$,99%)	5
Anthracene ($^{13}C_6$,99%)	5
Benz[*a*]anthracene ($^{13}C_6$,99%)	5
Benzo[*b*]fluoranthene ($^{13}C_6$,99%)	5
Benzo[*k*]fluoranthene ($^{13}C_6$,99%)	5
Benzo[*g,h,i*]perylene ($^{13}C_{12}$,99%)	5
Benzo[*a*]pyrene ($^{13}C_4$,99%)	5
Chrysene ($^{13}C_6$,99%)	5
Dibenz[*a,h*]anthracene ($^{13}C_6$,99%)	5
Fluoranthene ($^{13}C_6$,99%)	5
Fluorene ($^{13}C_6$,99%)	5
Indeno[1,2,3-*cd*]pyrene ($^{13}C_6$,99%)	5
Naphthalene ($^{13}C_6$,99%)	5
Phenanthrene ($^{13}C_6$,99%)	5
Pyrene ($^{13}C_3$,99%)	5

Catalog #	Compound	Amount
ES-2528	**D-Labeled PAH Cocktail for CARB Method 429**	1 mL in Benzene-D_6

Labeled	
Acenaphthene (D_{10},98%)	100
Acenaphthylene (D_8,98%)	100
Anthracene (D_{10},98%)	100
Benz[*a*]anthracene (D_{12},98%)	100
Benzo[*b*]fluoranthene (D_{12},98%)	100
Benzo[*k*]fluoranthene (D_{12},98%)	100
Benzo[*g,h,i*]perylene (D_{12},98%)	100
Benzo[*a*]pyrene (D_{12},98%)	100
Chrysene (D_{12},98%)	100
Dibenz[*a,h*]anthracene (D_{14},98%)	100
Fluoranthene (D_{10},98%)	100
Fluorene (D_{10},98%)	100
Indeno[1,2,3-*cd*]pyrene (D_{12},98%)	100
Naphthalene (D_8,99%)	100
Phenanthrene (D_{10},98%)	100
Pyrene (D_{10},98%)	100

Catalog #	Compound	Amount
ES-2044	**D-Labeled PAH Surrogate Cocktail**	1 mL in 50% Methylene chloride-D_2/50% Methanol-OD

Labeled	
Acenaphthylene (D_8,98%)	200
Benzo[*a*]pyrene (D_{12},98%)	200
Benzo[*g,h,i*]perylene (D_{12},98%)	200
Fluoranthene (D_{10},98%)	200
Naphthalene (D_8,99%)	200
Phenanthrene (D_{10},98%)	200
Pyrene (D_{10},98%)	200

	Catalog #	Compound	Amount
NEW	ES-5386	**PAH-SIM Recovery Standard Mixture**	1.2 mL in Methylene

Labeled	
2-Methylnaphthalene (D_{10},98%)	1000
Anthracene (D_{10},98%)	1000
***p*-Terphenyl (D_{14},98%)**	1000
Benzo[*e*]pyrene (D_{12},98%)	1000

Isotope Labeled PAH Standard Mixtures

Catalog #	Compound	Amount
ES-2043	**"EEC Six" PAH Cocktail**	1.2 mL in Benzene-D_6

Labeled	(µg/mL)
Benzo[*b*]fluoranthene (D_{12},98%)	1000
Benzo[*k*]fluoranthene (D_{12},98%)	1000
Benzo[*g,h,i*]perylene (D_{12},98%)	1000
Benzo[*a*]pyrene (D_{12},98%)	1000
Indeno[1,2,3-*cd*]pyrene (D_{12},98%)	1000
Fluoranthene (D_{10},98%)	1000

	Catalog #	Compound	Amount
NEW	ES-5164	**PAH Surrogate Standard Mixture**	10 mL in 90% Toluene/ 10% Isooctane

Labeled	
Naphthalene (D_8,99%)	200
Benz[*a*]anthracene (D_{12},98%)	200
Phenanthrene (D_{10},98%)	200
Fluoranthene (D_{10},98%)	200
Benzo[*b*]fluoranthene (D_{12},98%)	200
Benzo[*a*]pyrene (D_{12},98%)	200
Benzo[*g,h,i*]perylene (D_{12},98%)	200
Indeno[1,2,3-*cd*]pyrene (D_{12},98%)	200
Dibenz[*a,h*]anthracene (D_{14},98%)	200
Acenaphthylene (D_8,98%)	200
Acenaphthene (D_{10},98%)	200
Fluorene (D_{10},98%)	200
Pyrene (D_{10},98%)	200
Benzo[*k*]fluoranthene (D_{12},98%)	200
Perylene (D_{12},98%)	200
Chrysene (D_{12},98%)	200

	Catalog #	Compound	Amount
NEW	ES-5438	**PAH Native Standard Mixture**	10 mL in 90% Toluene/ 10% Isooctane

Unlabeled	
Naphthalene	200
Benz[*a*]anthracene	200
Phenanthrene	200
Fluoranthene	200
Benzo[*b*]fluoranthene	200
Benzo[*a*]pyrene	200
Benzo[*g,h,i*]perylene	200
Indeno[1,2,3-*cd*]pyrene	200
Dibenz[*a,h*]anthracene	200
Acenaphthylene	200
Acenaphthene	200
Fluorene	200
Pyrene	200
Benzo[*k*]fluoranthene	200
Perylene	200
Chrysene	200

Isotope Labeled Polychlorinated Naphthalene (PCN) Standards

Catalog #	Compound	Concentration	Amount
ECN-5240	**1,2,3,4-Tetrachloronaphthalene ($^{13}C_{10}$,99%)** (CP: 96%)	10 µg/mL in Isooctane	1.2 mL
ECN-5241	**1,3,5,7-Tetrachloronaphthalene ($^{13}C_{10}$,99%)**	10 µg/mL in Isooctane	1.2 mL
ECN-5250	**1,2,3,5,7-Pentachloronaphthalene ($^{13}C_{10}$,99%)**	10 µg/mL in Isooctane	1.2 mL
ECN-5260	**1,2,3,4,5,7-Hexachloronaphthalene ($^{13}C_{10}$,99%)**	10 µg/mL in Isooctane	1.2 mL
ECN-5261	**1,2,3,5,6,7-Hexachloronaphthalene ($^{13}C_{10}$,99%)** (contains 0.2% native)	10 µg/mL in Isooctane	1.2 mL
ECN-5270	**1,2,3,4,5,6,7-Heptachloronaphthalene ($^{13}C_{10}$,99%)** (contains 2% native)	10 µg/mL in Isooctane	1.2 mL
ECN-5280	**Octachloronaphthalene ($^{13}C_{10}$,99%)**	10 µg/mL in Isooctane	1.2 mL

Unlabeled Polychlorinated Naphthalene (PCN) Standards

ECN-2610	**1-Monochloronaphthalene** (CP: 90%, 10% 2-Monochloronaphthalene)	100 µg/mL in Nonane	1 mL
ECN-2611	**2-Monochloronaphthalene**	100 µg/mL in Nonane	1 mL
ECN-2620	**1,2-Dichloronaphthalene** (CP: 92%)	100 µg/mL in Nonane	1 mL
ECN-2621	**1,4-Dichloronaphthalene** (CP: 92%)	100 µg/mL in Nonane	1 mL
ECN-2622	**1,5-Dichloronaphthalene** (CP: 91%)	100 µg/mL in Nonane	1 mL
ECN-2623	**1,8-Dichloronaphthalene**	100 µg/mL in Nonane	1 mL
ECN-2624	**2,3-Dichloronaphthalene**	100 µg/mL in Nonane	1 mL
ECN-2630	**1,2,3-Trichloronaphthalene**	100 µg/mL in Nonane	1 mL
ECN-2640	**1,2,3,4-Tetrachloronaphthalene**	100 µg/mL in Nonane	1 mL
ECN-2642	**1,2,5,6-Tetrachloronaphthalene**	100 µg/mL in Nonane	1 mL
ECN-2641	**1,3,5,7-Tetrachloronaphthalene**	100 µg/mL in Nonane	1 mL
ECN-2643	**2,3,6,7-Tetrachloronaphthalene**	100 µg/mL in Nonane	1 mL
ECN-2652	**1,2,3,4,6-Pentachloronaphthalene**	100 µg/mL in Nonane	1 mL
ECN-2651	**1,2,3,5,7-Pentachloronaphthalene**	100 µg/mL in Nonane	1 mL
ECN-2650	**1,2,3,5,8-Pentachloronaphthalene**	100 µg/mL in Nonane	1 mL
ECN-2653	**1,2,3,6,7-Pentachloronaphthalene** (CP: 96%)	100 µg/mL in Nonane	1 mL
ECN-2660	**1,2,3,4,6,7-Hexachloronaphthalene**	100 µg/mL in Nonane	1 mL
ECN-2663	**1,2,3,5,6,7-Hexachloronaphthalene**	100 µg/mL in Nonane	1 mL
ECN-2664	**1,2,3,5,6,8-Hexachloronaphthalene**	100 µg/mL in Nonane	1 mL
ECN-2662	**1,2,3,5,7,8-Hexachloronaphthalene**	100 µg/mL in Nonane	1 mL
ECN-2665	**1,2,3,6,7,8-Hexachloronaphthalene** (CP: 97%)	100 µg/mL in Nonane	1 mL
ECN-2666	**1,2,4,5,6,8-Hexachloronaphthalene**	100 µg/mL in Nonane	1 mL
ECN-2661	**1,2,4,5,7,8-Hexachloronaphthalene**	100 µg/mL in Nonane	1 mL
ECN-2670	**1,2,3,4,5,6,7-Heptachloronaphthalene**	100 µg/mL in Nonane	1 mL
ECN-2671	**1,2,3,4,5,6,8-Heptachloronaphthalene**	100 µg/mL in Nonane	1 mL
ECN-2680	**Octachloronaphthalene**	100 µg/mL in Nonane	1 mL

Polychlorinated Naphthalene (PCN) Standard Mixtures

Catalog #	Compound	Amount
ECN-5102	**Tetra-Octa PCN Mixture**	1.2 mL in Isooctane

Labeled	(µg/mL)
1,2,3,4-TetraCN ($^{13}C_{10}$,99%)	1.0
1,3,5,7-TetraCN ($^{13}C_{10}$,99%)	1.0
1,2,3,5,7-PentaCN ($^{13}C_{10}$,99%)	1.0
1,2,3,5,6,7-HexaCN ($^{13}C_{10}$,99%)	1.0
1,2,3,4,5,6,7-HeptaCN ($^{13}C_{10}$,99%)	1.0
OctaCN ($^{13}C_{10}$,99%)	1.0

ECN-5178	**Tetra-Octa PCN Mixture**	1.2 mL in Nonane

Unlabeled	
1,2,3,4-TetraCN	1.0
1,3,5,7-TetraCN	1.0
1,2,3,5,7-PentaCN	1.0
1,2,3,5,6,7-HexaCN	1.0
1,2,3,4,5,6,7-HeptaCN	1.0
OctaCN	1.0

Halowax Technical Mixtures

ECN-1000	**HALOWAX 1000**	100 µg/mL in Hexane	2 mL
ECN-1013	**HALOWAX 1013**	100 µg/mL in Hexane	2 mL
ECN-1051	**HALOWAX 1051**	100 µg/mL in Hexane	2 mL

Substituted Benzothiophenes

Subsituted dibenzothiophenes, sulfur analogs of the chlorinated dibenzofurans, are of interest to analysts due to their remarkable similarities to the chlorinated dioxin class of compounds. A very high mass resolution is necessary to distinguish a chlorinated dibenzothiophene from a chlorinated dioxin. This fact, coupled with the lack of commercially available pure isomers of these sulfur-containing compounds, has led to some speculation that in certain cases, compounds being quantitated as dioxins were, in reality, dibenzothiophenes.

ET-4025	**2,3,7,8-Tetrachlorodibenzothiophene (unlabeled)**	$C_{14}Cl_4H_4S$	50 µg/mL in Nonane	1.2 mL
DLM-4308-1.2	**Benzo[*b*]naphtho[2,1-*d*]-thiophene (D_{10},96%)**	$C_{16}D_{10}S$	100 µg/mL in Benzene-D_6	1.2 mL
ULM-7430-1.2	**Benzo[*b*]naphtho[2,1-*d*]-thiophene (unlabeled)**	$C_{16}H_{10}S$	100 µg/mL in Benzene	1.2 mL