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ENVIRONMENTAL STANDARDS

Polycyclic Aromatic Hydrocarbon Standards

¹³C PAHs

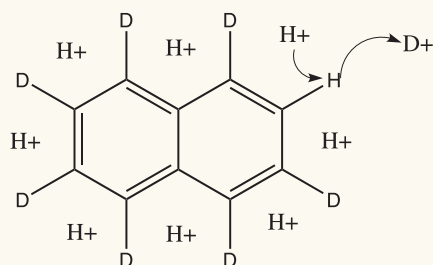
¹³C PAHs do not suffer from Deuterium Back-Exchange and Resemble Unlabeled Analytes

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.

Naphthalene-D₈ Deuterium-Exchange

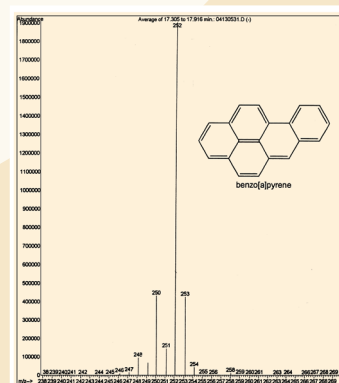
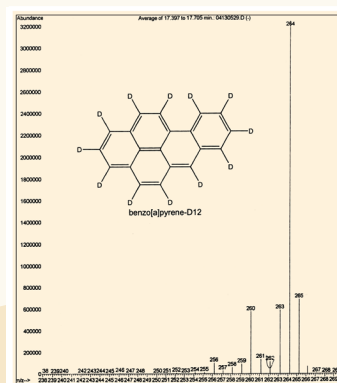


Similar Mass Spectra

Even at lower voltages the parent ion loses a considerable number of protons or deuterons. Mass spectra of ¹³C 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 deuterium 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. ¹³C-labeled Benzo [a] pyrene, however, will match the unlabeled material with the 4 AMU shift being the only difference between the two profiles.

¹³C Mass Spectra Resemble Unlabeled Analytes



●e@lgcpromochem.com
www.lgcpromochem.com

INDIA

LGC Promochem
India Private Limited
Bangalore
t: (91) 80-2361-4774
f: (91) 80-2361-3859
in@lgcpromochem.com
www.lgcpromochem.com
(additional offices:
Mumbai, Hyderabad)

ITALY

LabService Analytica s.r.l.
Anzola Dell'Emilia BO
t: (39) 051-732351
f: (39) 051-732759
info@labservice.it
www.labservice.it

JAPAN

Otsuka Pharmaceutical Co., Ltd.
Tokyo
t: 03-3257-6529 (in Japan only)
isotope@otsuka.jp

Wako Pure Chemical Industries
Osaka
t: (81) 66-203-1594
f: (81) 66-201-5964
labchem-tec@wako-chem.co.jp
www.wako-chem.co.jp

KOREA

KNJ Engineering, Inc.
Kyonggi-Do
t: (82) 2-424-7082
f: (82) 2-425-3026
knj@knj-eng.co.kr
www.knj-eng.co.kr

NETHERLANDS

LGC Promochem GmbH
Wesel, Germany
t: (49) 281-9887-250
f: (49) 281-9887-199
de@lgcpromochem.com
www.lgcpromochem.com

NORWAY

LGC Promochem AB
Borås, Sweden
t: (46) 3320-9060
f: (46) 3320-9079
se@lgcpromochem.com
www.lgcpromochem.com

POLAND

LGC Promochem Sp.z.o.o.
Lomianki
t: (48) 22-751-31-40
f: (48) 22-751-58-45
pl@lgcpromochem.com
www.lgcpromochem.com

SPAIN/PORTUGAL

LGC Promochem, S.L.
Barcelona
t: (34) 93-308-41-81
f: (34) 93-307-36-12
es@lgcpromochem.com
www.lgcpromochem.com

SWEDEN

LGC Promochem AB
Borås
t: (46) 3320-9060
f: (46) 3320-9079
se@lgcpromochem.com
www.lgcpromochem.com

SWITZERLAND

LGC Promochem GmbH
Wesel, Germany
t: (49) 281-9887-250
f: (49) 281-9887-199
de@lgcpromochem.com
www.lgcpromochem.com

TAIWAN

Long Chain International Corp.
Taipei
toll free: 0800-221-015
t: (886) 2-2552-2605
f: (886) 2-2552-1269
ywalter@chainet.com.tw
www.chainet.com.tw

UNITED KINGDOM

LGC Promochem
Teddington
t: (44) (0) 2089-437565
f: (44) (0) 2089-437554
uksales@lgcpromochem.com
www.lgcpromochem.com

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