



CIL

Cambridge Isotope Laboratories, Inc.
www.isotope.com

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.

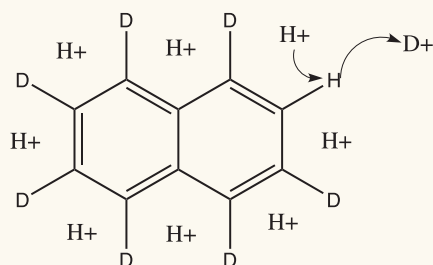
Deuterium-labeled PAH Metabolites are even more susceptible to the phenomena of back exchange and loss of protons/deuterons in the mass spectrometer.

Similar Mass Spectra

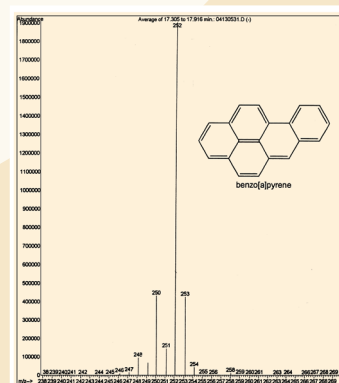
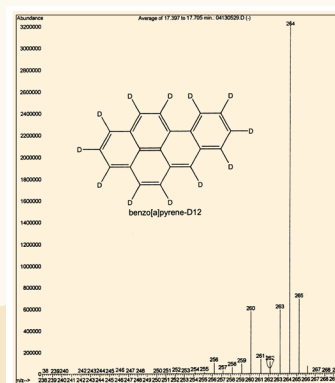
Even at lower voltages the parent ion loses a considerable number of protons or deuterons. Mass spectra of ¹³C PAHs will show a succession of proton losses (M-1, M-2, M-3, M-4 etc., similar to native PAHs), while mass spectra of Deuterated PAHs will show a succession of deuterium losses (M-2,M-4,M-6,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

Naphthalene-D₈ Deuterium-Exchange



¹³C Mass Spectra Resemble Unlabeled Analytes



AUSTRALIA

Novachem Pty. Ltd.
Collingwood VIC
t: (61) 3-8415-1255
f: (61) 3-8415-1366
sales@novachem.com.au
www.novachem.com.au

AUSTRIA

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

BELGIUM

LGC Promochem SARL
Molsheim Cedex, France
t: (33) 3-88-04-82-82
f: (33) 3-88-04-82-90
fr@lgcpromochem.com
www.lgcpromochem.com

CHINA

Key Bond International Limited
Beijing
t: (86) 10-6835-1232
f: (86) 10-6835-7048
jason@keybond.com
(additional offices: Shanghai,
Guangzhou, Wa Han and Cheng Du)

CZECH REPUBLIC

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

DENMARK

Bie & Berntsen A-S
Rødovre
t: (45) 4-494-8822
f: (45) 4-494-2709
info@bie-berntsen-as.dk
www.bie-berntsen-as.dk

FINLAND

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

FRANCE

LGC Promochem SARL
Molsheim Cedex
t: (33) 3-88-04-82-82
f: (33) 3-88-04-82-90
fr@lgcpromochem.com
www.lgcpromochem.com

GERMANY

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

HUNGARY

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

For accounts where a CIL distributor is not listed, our terms are:

- DELIVERY:** F.O.B. point Andover, MA, USA.
Shipping charges are additional (air mail or courier for non-hazardous goods; air freight for hazardous chemicals as defined by IATA/ICAO).
- PAYMENT:** Prepayment in U.S. Dollars by wire transfer or check drawn on U.S. bank (unless credit terms are established). MasterCard/VISA/American Express are also accepted.
- PRICES:** Please contact our International Customer Service Department for pricing information.



Cambridge Isotope Laboratories, Inc.

50 Frontage Road Andover, MA 01810-5413

direct: 1.978.749.8000

toll-free: 1.800.322.1174

fax: 1.978.749.2768

e-mail: envsales@isotope.com

web: www.isotope.com