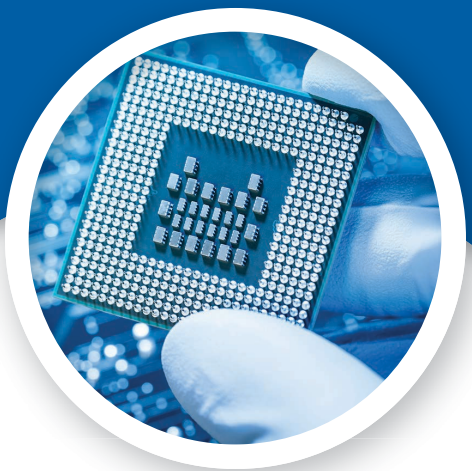
Deuterated Reagents and High-Purity Gases for Electronic Applications



Cambridge Isotope Laboratories, Inc. (CIL) is a reliable and trusted partner supplying deuterated solvents and high-purity deuterium and carbon monoxide gases. CIL has the largest nongovernmental deuterium oxide (D_2O) re-enrichment columns in the world and is also the global leader in the separation of ^{13}C and ^{18}O isotopes. CIL separates both ^{13}C and ^{18}O at CIL Isotope Separations (CIS) in Xenia, OH.

OLED – AMOLED and PhOLED

Organic light-emitting diodes (OLEDs) are extensively used in devices such as television and mobile phone screens. OLEDs are generally made of thin layers of organic molecules between two electrodes. The devices emit light when an electric current flows through them.

Until a few years ago, the biggest technical problem for OLEDs was the limited lifetime of the organic materials, typically half that of LCD, LED, or PDP, as heat and oxidation generated during operation contribute to the instability of the chemicals. The problem was solved by deuterating some of the organic molecules used in OLEDs, which increases the lifetime of the device by a factor of five to 20 without significantly affecting other properties of the device.

Deuteration is also used as an application in the field of neutron reflectometry, along with deuteration of specific molecular layers, which has become the key method for the study of the morphology, diffusion, and interfacial behavior in organic thin-film semiconducting devices.[1]

Semiconductors

High-purity carbon monoxide is also used for electronic and semiconductor applications. CIL is a primary manufacturer of ultrahigh-purity CO (UHP) for specialized electronic and other applications.

Optical Fibers

Optical fibers are used extensively when transmitting data over longer distances and at higher bandwidths (data rates) than traditional copper cables. However, in an internet-driven world hungry for data, it is crucial to achieve data transmission in the Gbps range. Traditional glass or plastic optical fibers have limited speeds due to the water peak absorption between 1360 nm and 1460 nm. Replacing the hydrogen with deuterium in the material now makes it possible to reach much higher speeds compatible with today's demands.[2]

Deuterated Reagents for Electronics

Catalog No.	Description
DLM-9RG*	Acetone-d_6 (D, 99.5%)
DLM-710RG*	Ammonium deuteroxide-d_5 (D, 99%) ~25% sol. in D_2O
DLM-1RG*	Benzene-d_6 (D, 99%)
HPG-040	Carbon monoxide – CP 99.99%
HPG-045	Carbon monoxide – CP 99.995%
DLM-7RG*	Chloroform-d (D, 99.7%)
DLM-408DR	Deuterium (D, 99.8%) D_2, 99.6% + HD, 0.4%
DLM-408-HP	Deuterium (D, 99.8%) CP 99.999%
DLM-408-4NHP	Deuterium (D, 99.8%) CP 99.99%+
DLM-458DR	Deuterium chloride (D, 99%)
DLM-3DR	Deuterium chloride (D, 99.5%) DCl 35% w/w solution in D_2O
DLM-4DR-99.8	Deuterium oxide (D, 99.8%)
DLM-4DR	Deuterium oxide (D, 99.9%)
DLM-10RG*	Dimethyl sulfoxide-d_6 (D, 99.9%)
DLM-16	Ethanol-OD (D, 99%) <6% D_2O
DLM-24RG*	Methanol-d_4 (D, 99.5%)
DLM-45DR	Sodium deuteroxide (D, 99.5%) 40% in D_2O
DLM-33DR	Sulfuric acid-d_2 (D, 99%) 96-98% in D_2O
DLM-5RG*	Toluene-d_8 (D, 99.5%)
DLM-46RG*	Trifluoroacetic acid-d (D, 99%)

**Reagent grade* *CP = chemical purity*

References

1. Tsuji, H.; Mitsui, Chikahiko, M.; Nakamura, E. **2014**. The hydrogen/deuterium isotope effect of the host material on the lifetime of organic light-emitting diodes. *ChemComm, 50(94),* 14870-2. PMID: 25325237

2. Koike, Y. **2010**. "Progress in Low-Loss and High-Bandwidth Plastic Optical Fibers," Fundamentals of Plastic Optical Fibers, First Edition. Wiley-VCH Verlag GmbH & Co. KGaA 139-166.