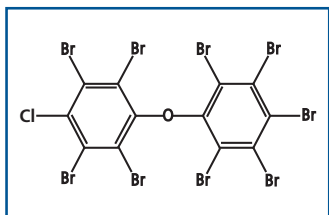




2,2',3,3',4,5,5',6,6'-Nonabromo-4'-chlorodiphenyl ether (4PC-BDE-208)



Mass-labelled reference standards are considered to be the ideal choice as surrogate standards for the quantification of environmental contaminants in complex matrices because their physical and chemical properties are essentially identical to those of the analytes of interest. However, in cases where an instrumental method is being used that can not differentiate between mass-labelled and native compounds (such as HRGC/ECD and HRGC/NCI/MS), an alternate standard needs to be employed.

In the case of the highly brominated diphenyl ethers, it is possible to use 4PC-BDE-208 as a surrogate when instrumental methods preclude the use of mass-labelled standards. Figure 1 shows the elution of 4PC-BDE-208 relative to a mixture of all of the octa-, nona-, and decabromodiphenyl ethers (BDE-OND). Since it elutes between BDE-206 and BDE-209, and is completely resolved from all of the BDE congeners, it is an excellent choice for use as a surrogate for these compounds. Its similarity in structure and chemical composition to the brominated diphenyl ethers also suggests that it will behave similarly during extraction and/or sample clean-up.

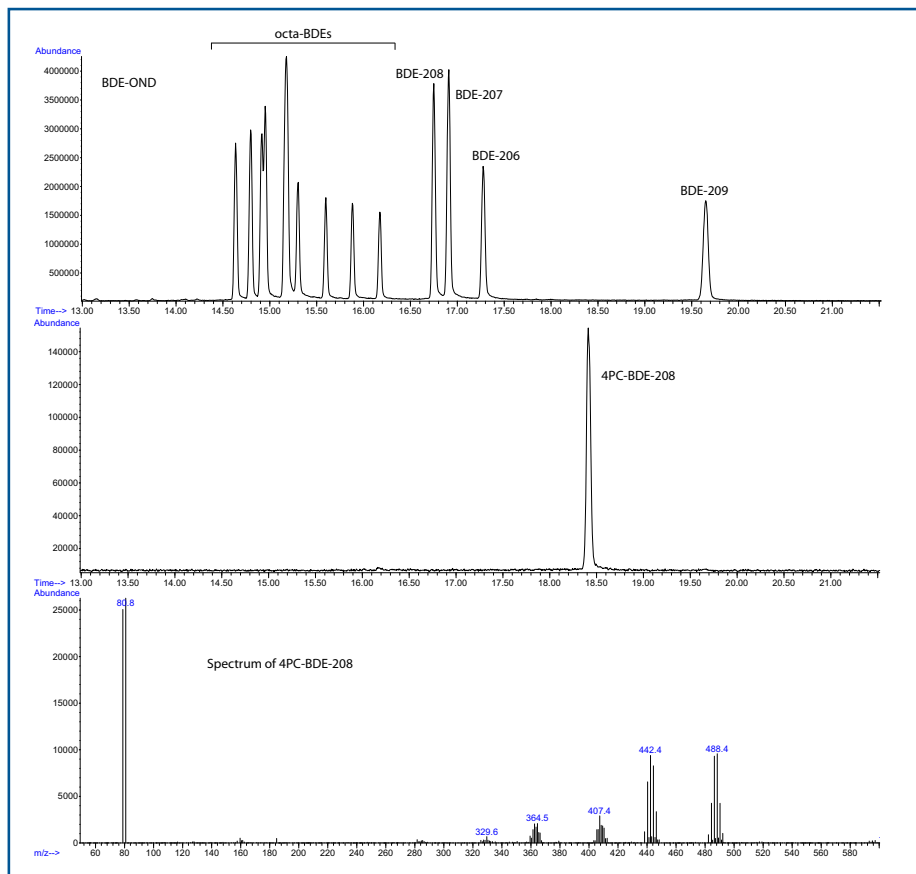


Figure 1: HRGC/NCI/MS chromatograms showing the elution of BDE-OND and 4PC-BDE-208 on a 15m DB-5HT (250 µm id, 0.1 µm film thickness) as well as the NCI spectrum of 4PC-BDE-208.

Obviously, 4PC-BDE-208 would not be a suitable surrogate if it had potential to be present in environmental matrices. The possibility does exist that incineration of wastes containing BDEs as well as a source of chlorine could lead to its formation. However, this process is unlikely considering its structure and the likelihood of chlorine-for-bromine exchange. A recent literature search supported this deduction as no report of 4PC-BDE-208 in environmental samples was found.

Analysis of the penta-, octa-, and deca-BDE technical mixtures also did not result in the detection of 4PC-BDE-208 reinforcing the conclusion that it is a suitable surrogate standard for the highly brominated diphenyl ethers.