

Gas chromatographic separation of benzene and deuterobenzenes

It has recently been shown¹ that isotopically substituted hydrocarbons can be separated by partition chromatography. In order to evaluate the efficiency of gas chromatography for the identification of isotopic molecules the replacement of deuterium atoms in the benzene molecule has been followed.

By using a glass capillary column of about 250 m coated with a non-polar liquid phase, such as squalane, with a number of theoretical plates of about 350,000 (using *n*-heptane as reference) a complete separation of C_6H_6 and C_6D_6 and a partial separation of $C_6H_3D_3$ and $C_6H_2D_4$ was obtained, as shown in Fig. 1.

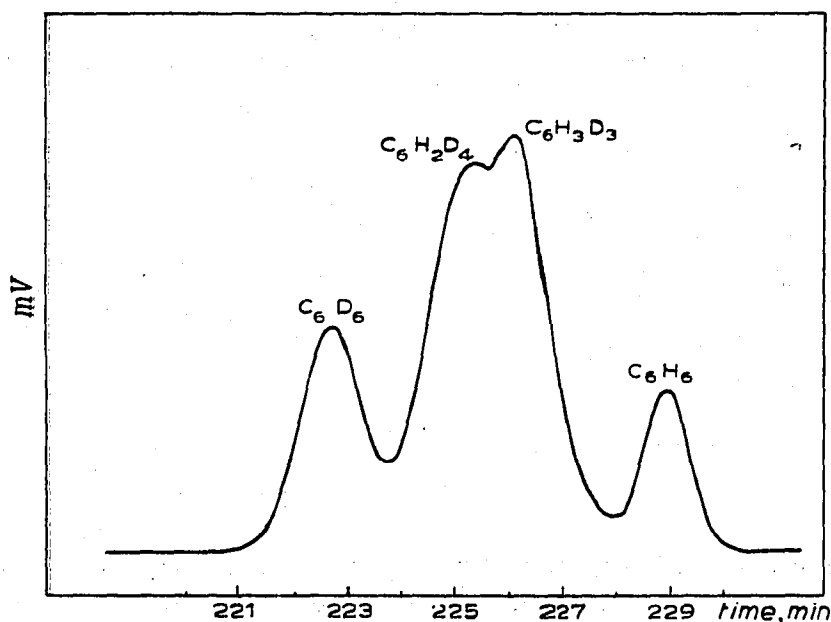


Fig. 1. Separation of benzene and deuterobenzenes. Column: glass capillary, 250 m long, 0.28 mm bore. Stationary phase: squalane. Carrier gas: nitrogen. Inlet pressure: 680 mm Hg. Temperature: 10°. Flow rate: 0.25 ml/min. Efficiency: 350,000 theoretical plates. Detector: flame ionization.

It seems that by increasing the number of theoretical plates and by choosing a suitable liquid phase, which plays a very important role also in the separation of isotopically substituted molecules², a mass difference of a few parts per hundred might be sufficient to achieve an effective separation.

*Istituto di Chimica Analitica,
Università di Napoli (Italy)*

F. BRUNER
G. P. CARTONI

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