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Short-cycle fast temperature program gas chromatograph for SFC×GC

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We present a fast chromatographic system that can be used as a second dimension in comprehensively coupled supercritical fluid chromatography/gas chromatography. The short (1 metre long) capillary column is heated by a coaxial stainless steel tube. The stainless steel tube is heated by an electrical current. The temperature of the stainless steel is measured by determing the resistance through the current/voltage ratio, calibrated to a fine-wire thermocouple probe inserted inside the tube.

I. INTRODUCTION

A.

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II. INTRODUCTION

The tremendous separating power of

The higher the orthogonality of a comprehensively coupled system, the bigger the general elution problem of the second (gas chromatography)dimension. Longer elution times lead to better separation, but also to flatter peaks, making quantitation harder.

Agilent has a 'low thermal mass' unit, which includes a heating wire and a sensing element bundled with the column. We presume that the sensing element works with the resistance. The unit cools down to the temperature of the oven.

Zip Scientific uses a rather more brute-force technique. They connect a supply of chilled air to the GC oven to cool it down after each GC run, leaving the user free to use any conventional GC supplies to create their own method.

In previous work in our laboratories we used the cryogenic function of the Varian 3300 gas chromatograph to cool down the column at the beginning of each run. Each cooling run required 30 seconds to get back to temperature, using large quantities of coolant in the process.

III. EXPERIMENTAL

A. Hardware

The short-cycle fast gas chromatograph was built into a highly modified Varian 3300 gas chromatograph. The oven temperature control was disabled and none of the programming or data functions was used. The inlet and detector were under temperature control of the original electronics and instrument control system.

The coaxial heater tube was mounted on a specially designed manifold. Electrical connections were silver soldered to the ferrules the sealed the tube to the manifold. These soldered/brazed joints helped to

B. Electronics

C. Software

IV. RESULTS AND DISCUSSION

V. CONCLUSION

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