

heated in the temperature range 600°–800° C. This suggests that at least some of the coal may not have reached the high temperatures associated with the arc. Optical and electron microscope investigations indicate that the majority of the soot particles are in the submicron range.

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R. L. BOND
I. F. GALBRAITH
W. R. LADNER
G. I. T. MCCONNELL

British Coal Utilisation Research Association,
Randalls Road,
Leatherhead.

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Detection of Nitric Oxide by Gas-chromatography

IN an investigation on the feasibility of using gas-chromatographic methods to determine the oxides of nitrogen in gaseous mixtures such as Diesel exhaust gases, we have successfully used a standard argon ionization cell to detect small volumes of nitric oxide. The limit of detection was of the order of 0.01 μ l. A glass column was used, packed with molecular sieve No. 5A, and fitted to a Pye panchromatograph.

The nitric oxide–argon mixtures used were prepared by serial dilution. In order to limit the extent to which oxidation of the nitric oxide could take place during the preparation of nitric oxide–air mixtures, the following procedure was adopted. A nitric oxide–argon mixture containing 0.1 per cent nitric oxide was first prepared, and aliquots containing the required amounts of nitric oxide were transferred to evacuated gas tubes. These tubes were fitted with side arms closed with serum caps through which air was then admitted by the insertion of a hypodermic needle. A comparison of the peak heights obtained from nitric oxide–argon mixtures with those obtained from nitric oxide–air mixtures is given in Table 1.

Table 1. A COMPARISON OF NITRIC OXIDE–ARGON AND NITRIC OXIDE–AIR MIXTURES

Nitric oxide (μ l.)	Peak height response (mm)	
	Nitric oxide–air mixture	Nitric oxide–argon mixture
0.1	38.0	56.0
0.08	31.0	39.5
0.06	27.5	31.0
0.04	17.0	19.5
0.02	9.0	9.0
0.01	6.0	6.0

Column, 5 ft. length molecular sieve No. 5A at 100° C; detector, argon ionization cell, 1,750 V; argon flow-rate, 36 ml./min.

In the presence of oxygen (air) some oxidation of the nitric oxide occurred, but this diminished as the volume of added nitric oxide was reduced.

We have confirmed the results of previous workers^{1,2}, who indicated the necessity of pretreating the column ('conditioning') in order to obtain reproducible results. We have also been able to observe the non-linearity of the adsorption isotherm as an appreciable increase in retention time with decreasing nitric oxide concentration. This is shown for the range 0.1–1 μ l. in Fig. 1. In Fig. 2, these chromatograms have been superimposed to show that the peak maximum appears to follow the trailing edge of the nitric oxide response. As the retention time is a function of the amount of nitric oxide added, it should be possible to use this measurement for analytical purposes in place of the more usual peak height or peak area

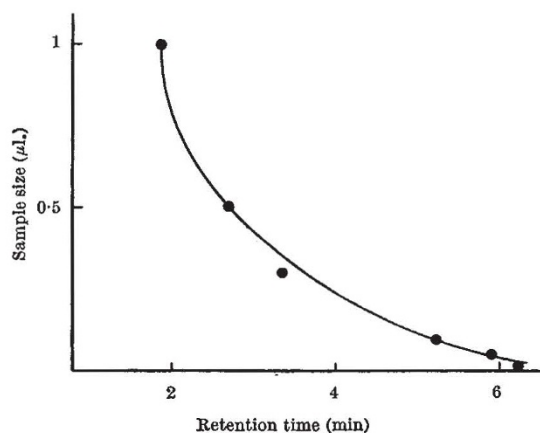


Fig. 1. Relationship between retention time and amount of nitric oxide added

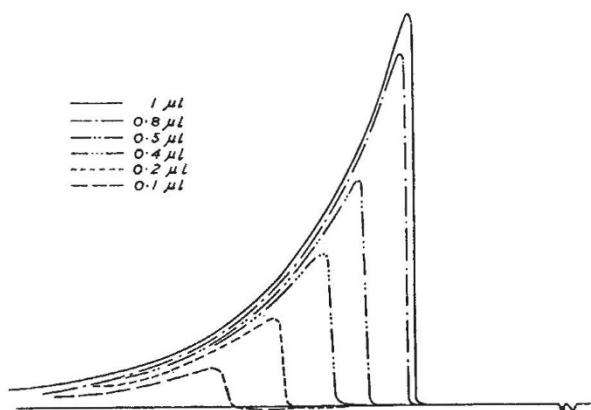


Fig. 2. Superimposed chromatograms of various amounts of nitric oxide

response. This would give increased accuracy at the lower concentration-levels where the retention time can be recorded more accurately.

P. J. KIPPING
P. G. JEFFERY

Warren Spring Laboratory,
Department of Scientific and Industrial Research,
Stevenage, Herts.

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Temperature as a Variable in Ion-exchange Paper Chromatography

TEMPERATURE is a variable which has received relatively little attention in chromatographic studies. This is particularly true of paper chromatography in which more attention is given to controlling temperature as an aid to reproducibility than to using temperature to effect improved resolution.

In ion-exchange column chromatography effective use is made of changes in temperature¹. The advantages claimed, however, are mainly associated with improved kinetics of the chromatographic process. Specific effects, such as varying positions of chromatographed peaks, which cannot be assigned simply to the temperature dependence of *pH* have been observed but no systematic examination has been made of the effect of temperature on selectivities.

This communication is an account of part of a general investigation of the effect of temperature on ion-exchange paper chromatography and was stimulated by the results of an earlier investigation which demonstrated the marked