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## Note

### Paper chromatographic identification of the alkali metal ions

#### Eluents with H<sub>2</sub>S

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In the chromatographic identification of alkali metal ions problems have arisen owing to the scarcity of colour reagents that characterize these ions. In 1951, Erlenmeyer *et al.*<sup>1</sup> proposed the use of violuric acid, which gives red-violet spots with the alkali ions, but unfortunately the colour intensity is weak<sup>2</sup> and the formation of violurates occurs only when the alkali ions are associated with anions of weak acids<sup>3</sup>.

Recently, a description has been published of a reaction of the alkali metal violurates with H<sub>2</sub>S gas that causes the formation of the respective purpurates, with a much more intense colour<sup>4</sup>. This reaction can be applied to the identification of these ions in paper chromatography, if eluents with weak and volatile acids are used. Good results are obtained by using sulphurous acid as the eluent acid<sup>4</sup>. In this note we introduce the use of H<sub>2</sub>S as the eluent acid as a means of improving the identification of the alkali ions, as well as of obtaining a good separation. In this way, it is possible to eliminate one of the two above-mentioned disadvantages of the use of violuric acid. In a further communication we shall describe certain eluent systems that eliminate the other disadvantage.

#### EXPERIMENTAL

We used the standard method of ascending paper chromatography with some modifications. Elution was carried out in a special chromatography chamber. This consists of a glass column (50 cm height × 8 cm I.D.) provided (for gas entry) with an inlet tube with stopcock fitted on the inside wall of the column, at the lower part and reaching to the bottom, and with an outlet tube with a stopcock in the column stopper (see Fig. 1).

The eluent is prepared as follows: 14 ml of absolute ethanol, 2 ml of methanol and 4 ml of water are introduced in the chamber, the mixture stirred and a stream of H<sub>2</sub>S introduced through the inlet tube and allowed to pass through the mixture. An hour later the strip of chromatographic paper (Schleicher & Schüll No. 2040 b gew) containing 1 μmole of each of the alkali acetates is introduced into the chamber. Throughout the elution process, H<sub>2</sub>S is bubbled through the solvent. After 3 h of elution, the paper strip is taken out of the chamber and dried with warm air. It is then sprayed freely with an ethanolic solution of violuric acid. After either waiting for

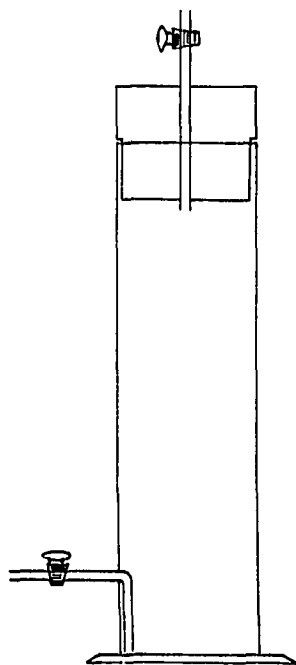


Fig. 1. Chromatography chamber.

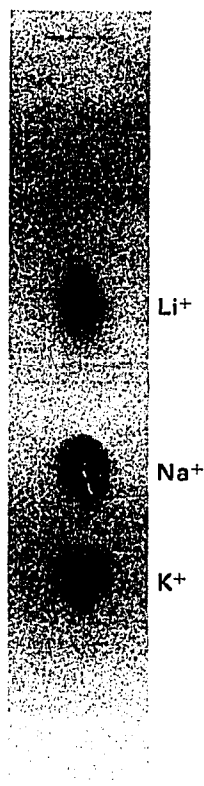


Fig. 2. Photograph of the results obtained on the chromatography of the alkali acetates when identified with violuric acid and  $H_2S$ .  $R_F$  value of  $Li^+ > R_F$  value of  $Na^+ > R_F$  value of  $K^+$ .

some minutes or drying it slightly, the strip is introduced into a chamber saturated with  $H_2S$ . The three strongly coloured spots of the alkali purpurates appear almost instantly. The results thus obtained are shown in Fig. 2.

#### REFERENCES

- 1 H. Erlenmeyer, H. von Hahn and E. Sorkin, *Helv. Chim. Acta*, 34 (1951) 1419.
- 2 F. Modreanu, *J. Chromatogr.*, 1 (1958) 554.
- 3 K. Becherer, *Oesterr. Akad. Wiss., Math.-Naturwiss. Kl., Sitzungsber. Abt. 1*, 175 (1966) 107.
- 4 J. Beltrán and J. Faus, *Inform. Quim. Anal.*, 26 (1972) 63.