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PAPER CHROMATOGRAPHY OF INORGANIC IONS IN NITRATE MEDIA

II - Separation of Se - Te - Po and RaD - RaE - Po

by

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## PAPER CHROMATOGRAPHY OF INORGANIC IONS IN NITRATE MEDIA\*

## II - Separation of Se - Te - Po and RaD - RaE - Po

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The tendency of polonium to form nitrate complexes in solution is higher than that of its usual radioactive parents (RaD - RaE) and of its homologues (Se - Te). Nitrate media should therefore be useful for chromatographic separations between these elements.

A separation by paper chromatography between Se and Te, under the selenite-tellurite form, was obtained in nitric acid media with butanol-metanol<sup>1</sup>. The values of  $R_f$  for Pb and Bi in nitric acid with various solvents<sup>2</sup> are different enough to allow quantitative separations between these elements.

In a first series of experiments using several alcohols as

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1. F.H. Burstall, G.R. Davies, R.P. Linstead and R.A. Wells - J. Chem. Soc. 64, (1957).
2. E. Lederer and M. Lederer - "Chromatography", Elsevier Publishing Company, page 488, (1957).

solvents, we observed that the separations in nitric acid media are not very efficient since the  $R_f$  value for polonium is close to that obtained for selenium.

As was observed with the rare-earths<sup>3</sup> the addition of concentrated lithium nitrate to the nitric acid solution increases the  $R_f$  of polonium, allowing efficient separations.

The chromatograms below (fig. 1) were obtained in Whatmann paper N<sup>o</sup> 1 in a development of 18 hours at room temperature. As solvent we used a mixture of butanol (50%) and propanol (50%), previously shaken with a solution 7 M  $\text{LiNO}_3$  + 2 M  $\text{HNO}_3$ .

Se and Te as selenite and tellurite were detected by spraying  $\text{SnCl}_2$  and the spots were measured in an optical densitometer. RaD was detected through its gamma rays (47 Kev) in a scintillation spectrometer. RaE was measured in a G. M. counter and Po in a thin window mica counter.

Table 1 gives the values of  $R_f$  obtained in such conditions. These values are in reference to the second front of the solvent.

| Element | RaD  | Te   | RaE  | Se   | Po   |
|---------|------|------|------|------|------|
| $R_f$   | 0,27 | 0,47 | 0,62 | 0,72 | 0,97 |

These results show that good separations are obtained between Se-Te-Po and RaD-RaE-Po. It is also possible to separate all these five elements in a single chromatogram.

Experiments with weighable quantities of Pb and Bi gave the same values of  $R_f$  obtained with RaD and RaE.

