

compounds of molecular weight less than 100; on the other hand such effects may be useful in indicating the nature of unknown compounds in mixtures.

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## Paper chromatography of inorganic ions in nitrate media II. Separation of Se-Te-Po and RaD-RaE-Po

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 of these elements.

A separation by paper chromatography of Se and Te, in the selenite-tellurite

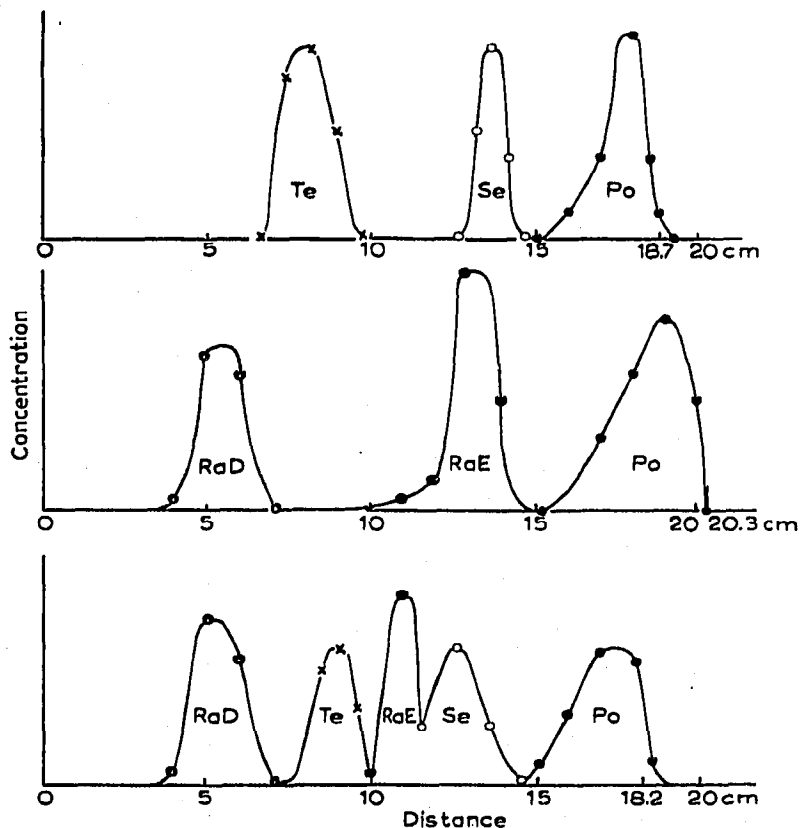


Fig. 1.

form, has been obtained in nitric acid media with butanol-methanol<sup>1</sup>. The  $R_F$  values for Pb and Bi in nitric acid with various solvents<sup>2</sup> differ sufficiently to allow quantitative separations of these elements.

In a first series of experiments using several alcohols as 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, and thus makes efficient separations possible.

The chromatograms given in Fig. 1 were obtained on Whatman paper No. 1 with a development time of 18 hours at room temperature. A mixture of butanol (50%) and propanol (50%) previously shaken with a solution of 7 M LiNO<sub>3</sub> + 2 M HNO<sub>3</sub>, was used as solvent.

Se and Te as selenite and tellurite were detected by spraying with SnCl<sub>2</sub> 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 I gives the  $R_F$  values obtained under these conditions. These values are referred to the second front of the solvent.

TABLE I

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 of 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  $R_F$  values as obtained with RaD and RaE.

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