

DISSERTATIONES

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Continuous Electrophoretic Separation of Radioactive Rare Earths

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The study includes: (a) electrophoretic mobilities of radioactive rare earths plotted against the gradient concentration of lactic acid with high voltage electrophoresis, and (b) the possibility of continuous electrophoretic separation of radioactive rare earth mixtures in 0.05 N lactic acid.

a) All lanthanides show the characteristic cathodic mobility in lactic acid concentrations between 0.01 and 0.1 N. Their electrophoretic mobility decreases with the increase of lactic acid concentration. By decrease of ionic radius of rare earths their cathodic mobilities decrease also, R_f — values of all rare earths increase with lactic acid concentration increase, i.e. the adsorption on cellulose decreases.

b) Relative electrophoretic mobilities of rare earths in 0.05 N lactic acid were determined. The rare earth complexibility in 0.05 N lactic acid increased with the decrease of ionic radius i.e. in the increasing direction of ordinal number. The diagrams give information about the possibility of continuous electrophoretic separations of all rare earths between the ordinal numbers 57 and 71.

The obtained results are in accordance with literature on rare earths with other complex media and with other techniques, such as ion exchange, extraction techniques and some others.

The continuous electrophoretic separation of the following radio-

active rare earth mixtures in 0.05 N lactic acid were described as: (1) Ce(144)-Tb(160)-Tm(170); (2) Ce(144)-Eu(152)-Yb(169); (3) Nd (147)-Er(169)-Lu(177); (4) Ce(144)-Gd(153)-Lu(177); (5) Ce(144)-Pm(147)-Tb(160)-Er(169)-Lu(177).

For each radioautogram of continuous electrophoretic separation a partition diagram of the activity of separated mixture components was found.

Besides, for the described experimental conditions, it is impossible to separate mixtures of rare earths with more than 5 components in 0.05 N lactic acid, not even by the enlargement of the corresponding apparatus.

The possibility of applying the continuous electrophoretic separation of radioactive rare earths to obtain carrier — free radionuclides, as well as in qualitative and quantitative radiometric analysis has been discussed.

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1. Continuous Electrophoretic
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Complexes
Electrophoresis
—, continuous, paper
Lactic acid
Mobilities, ionic
Radioactive isotopes
Rare earths
Separation methods