The behaviour of elements at extremely low concentrations sometimes deviates from that predicted by the physico-chemical rules which have been established in the region of ordinary concentrations. The classical methods of investigation are therefore often inadequate for the study of a microcomponent, i. e. of a component which is present at extremely low concentration.

The concentration of the microcomponent is often so low that addition of a precipitating agent does not cause the solubility product of the component to be exceeded, or if it is, the precipitate formed is imperceptible. The separation of a microcomponent in trace concentration can be achieved by precipitating a different macrocomponent in the presence of the microcomponent ("internally formed precipitate", I. F. P.) or by the addition of a precipitate of such a macrocomponent to the solution of the microcomponent ("externally formed precipitate, E. F. P.").

Sorption of microamounts of elements on Fe(OH)₃ and Fe₂O₃ precipitates has become the subject of numerous investigations, because of the extensive use of Fe(OH)₃ and Fe₂O₃ as carriers in microanalytical chemistry and radiochemistry. In this work the sorption of microamounts of gallium(III) on Fe(OH)₃ and Fe₂O₃ precipitates was investigated, by use of the radiotracer technique, as a function of pH, the preparation and age of the precipitate (t₀), and the duration of the contact between the sorbate and the sorbent (tₐ).
Experimental

All chemicals used in the present work were analytical reagent grade. The water used was twice distilled. The FeCl₃ "stock" solution was standardized gravimetrically²,³. Iron(III) oxide powder (α-form) (Merck) was used for the analytical standardization. The Fe₂O₃ sorbent samples were hydroxylated at the given pH for 5 days before labelling. Iron(III) hydroxide was precipitated from FeCl₃ solution with sodium hydroxide solution. The total concentration of sodium chloride in the systems was $1.5 \times 10^{-1} \text{ M}$. Gallium-67 was produced in the cyclotron of the "Rudjer Bošković" Institute. The radionuclide in the $^{67}\text{GaCl}_3$ form was used (carrier-free).

The sorption was characterized by the change in radioactivity of the separated liquid electrolyte phase compared with the radioactivity of a homogeneously distributed suspension of the sample. An aliquot of homogeneously distributed suspension was taken and its count-rate $A_1$ determined. The liquid phase was separated from the solid by means of a centrifuge. The same volume of carefully separated clear centrifugate was counted and count-rate $A_2$ obtained. The percentage sorption was calculated from

$$\frac{A_1 - A_2}{A_1} \cdot 100\%$$

![Fig. 1. The sorption of $^{67}\text{Ga}$ on Fe(OH)$_3$ precipitate, as a function of pH](image-url)