in decanol (No. 7). The poor reliability of analysis prevents here also further discussions.

**Summary**

To an aqueous solution of methoxy-polyoxyethylene decyl ether (a non-ionic surfactant), various amounts of a long chain alkyl compound such as hydrocarbon, alcohol, acid, amine or chlorohydrocarbon were added. Saturation amounts of solubilization, clouding points and phase separations in these systems were observed and the result is represented diagrammatically. The structure of each phase is discussed, based on the analysis of surfactant and distribution of added dye, taking also into account the light-scattering informations.

**Zusammenfassung**


**Introduction**

The rôle of the adsorption of the coagulating ion during the coagulation process was – according to the knowledge of the authors – not yet established definitely, possibly because the available techniques could not give the necessary precision. The present paper represents an attempt to determine the dependence of the adsorbed quantity of the coagulating Nd ion during the coagulation process of AgI on: 1. the precipitate age, 2. the concentration of Nd(NO₃)₃, 3. the pI value and 4. the concentration of other coagulating ions of different valencies. Further a comparison of the obtained results on adsorption with the coagulation concentrations of ions of different valencies is presented and the coagulation values of the Nd ion are established for the three Ag-halides as a function of the pI value.

**References**

3) Will be published elsewhere.

**Determination of the Ion Adsorption by the Radioactive Tracer Technique**

**II. Nd-Ion Adsorption and Coagulation of AgI**

By M. J. Herak and M. Mirnik

**With 5 figures in 6 details**

(Received July 7, 1959)

The adsorbed quantity of the Nd ion was measured by the radioactive labelling technique using the $\beta^-, \gamma$ emitting 11.6 days $^{147}$Nd as a tracer.

The aim of this paper is to contribute experimental data to the discussion on theories of double layer and of the colloid stability of ionic (hydrophobic) precipitates.

The precipitates were studied by the “in statu nascenti technique” avoiding many undefined and uncontrollable steps and giving the possibility to define some of the most important factors governing the precipitation.

**Experimental**

The “in statu nascenti” AgI precipitating systems were prepared by the addition from a pipet of 25 ml. of a AgNO₃ solution to 75 ml. of a magnetically stirred NaI $^\pm$ labelled Nd(NO₃)₃ solution. The delivery time of the pipet was 25 seconds. The systems were left standing for a given time, after which the mother
liquor was decanted and the precipitate slurry transferred by the aid of a dropper in a second beaker. The precipitate was filtered off through a circular filter paper in a metallic funnel of commercial type (Tracerlab Inc., Catalogue E-8 B). The filter paper with the precipitate was transferred to an aluminium counting tray and counted with a GM-counter. The precipitate + filter paper + counting tray was dried under an infrared lamp and the amount of the isolated AgI precipitate determined by weighing on a semimicrobalance.

The concentrations of the solutions were predetermined to give the final concentrations cited in the figures.

The active Nd(NO₃)₃ solution was prepared by dissolution of an active Nd₂O₃ sample in nitric acid. The excess HNO₃ was evaporated under an infrared lamp, and the residue dissolved in a 10⁻⁴ N HNO₃. 1 ml. of this solution was added to the main precipitating solution. The activity of this solution gave in optimal cases on the precipitates an activity of about 1000 counts per minute. The samples were counted till the total count amounted to about 2000 to 5000 counts. The Nd₂O₃ sample was obtained from Harwell with a declared specific activity of 1 mc/g.

The used chemicals were Merck analytical grade. The water was bidistilled, the second time from a silica still.

The aged AgI (fig. 2b) was precipitated by the addition of 500 ml. of a 0.1 N AgNO₃ solution to an equal stirred volume of 0.1 N NaI solution. The last parts of the solution were added drop by drop till the precipitate flocculated. The precipitate was decanted several times with water and left standing for 14 days.

The coagulation values of fig. 5 were determined by the technique described elsewhere (1). The intersections of the tangents on the steepest parts of the 10 minutes tyndallograms with the concentration abscissa were taken as the coagulation values.

The pl values were determined by the calculated excess concentrations of NaI except in the pl 5.5 to 7 range where they were determined potentiometrically by the paraffined Ag/AgI electrode (3, 7).

Results

Fig. 1a shows that the adsorbed amount of Nd³⁺ is in the first 50 mins. decreasing with the precipitate age to reach after this time a final value of 3.5 mg. equiv. Nd³⁺/g mole AgI which remains practically constant even after 15 hours. For practical reasons in subsequent determinations the 15 hours age of precipitates was chosen as representative for the adsorbed amount of Nd³⁺.

The influence of the concentration of the Nd(NO₃)₃ on the adsorption of Nd³⁺ is represented in fig. 1b for concentrations 10⁻⁴ to 10⁻³ N. At higher concentrations the specific activity of the Nd(NO₃)₃ became too low, and it was the same at lower concentrations with the total activity, to give reliable results on adsorption. In the investigated concentration region the amount adsorbed of the coagulating ion is constant and independent on its concentration.

From fig. 2 can be concluded that the amount of the adsorbed ion is a linear function of the pl value. The approximate value of the adsorption capacity \( I' \) (= change of the amount adsorbed per 1 pI unit (mg equiv. Nd³⁺/g mole AgI)) [in parts per thousand calculated by the formula:

\[
I' = \frac{A \text{ ads Nd}^{3+} \cdot 1000}{A \text{ pI} \cdot e_{AgI}}
\]

is 0.25 for the precipitate “in statu nascendi” and about 0.5 for the “aged” precipitate. More significant is the difference between the absolute amounts of the adsorbed ion, which may be characterized by the zero point of the adsorbed amount on the pI axis. For the precipitate “in statu nascendi” the zero point is at about pl = 14.4 while for the “aged” precipitate the zero point is at about 5.7. It