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Conference Discussion

Coagulation of Silver Iodide in the Presence of Tensides*

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In connection with silver iodide systems containing various tensides we can show an »irregular« behaviour of the negative silver iodide sol in the presence of sodium *n*-dodecyl sulphate, SDS.[1] The AgI—NaI—SDS system is formed *in statu nascendi, i. e.* by pouring the silver nitrate solution into the solution of sodium iodide + SDS (of specially pure grade BDH reagent). Obtained tyndallometric values, T. V., show (Fig. 1) a typical tyndall maximum at 1×10^{-4} M SDS, a »coagulation«

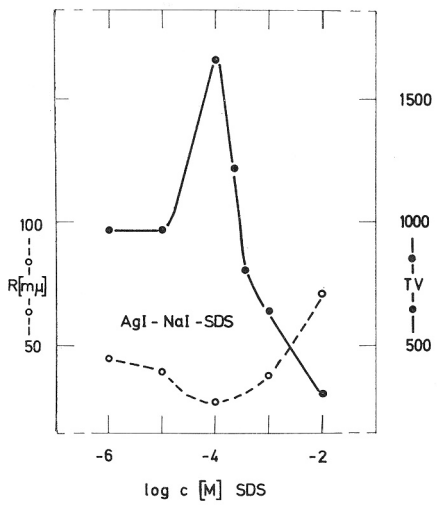

Fig. 1. Curve of turbidity, T. V. (1000 minutes after mixing the precipitation components) against log molar concentration of sodium *n*-dodecyl sulphate, SDS (hard line) and curve of AgI crystallite sizes, millimicrons mμ (dashed line), *versus* log molar concentration of SDS (1000 minutes after mixing).

minimum at 1×10^{-5} M SDS and the »stabilization« region between 1×10^{-4} up to 1×10^{-2} M SDS. This is a very interesting phenomenon, because in this case we have a typical colloid interaction between negatively charged particles and the negative ion (the present sodium ion cannot act since it is far below the critical coagulation concentration). X-ray examination yielded results which show that at 1×10^{-4} M SDS the smallest crystallites of the silver iodide were obtained, at 1×10^{-2} M SDS the largest, and at 1×10^{-6} M SDS, middle sized silver iodide crystallites were obtained. X-ray analysis shows an inversed picture of »R(millimicrons) *versus* log c SDS« as compared to »T. V. *versus* log c SDS«. What is the reason for this »irregular« behaviour of the negatively charged silver iodide sol in the presence of an anionic

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tenside? As an anionic species SDS cannot act electrostatically in stable negative silver iodide suspensions. In this case, only very strong van der Waals attractions between the carbon chains of SDS with the crystal surface of the silver iodide particles can be supposed as reasonable and determinant in the observed phenomena.

The tyndall maxima obtained in all our other experiments without surfactants show[2] discontinuities of the »T. V. *versus* pAg(pI)« curve as in the Fig. 2. Presented results show the typical tyndall maximum (dashed line) in congruity with the maximum of the crystallite sizes (dotted line) of AgI, and with the percentage (hard line) of the cubic form of the silver iodide. The presented comparison of the X-ray data and the T. V. data are of a great importance, because they show that the transformations of the particle sizes in the silver iodide suspensoins could be obtained from T. V. analysis.

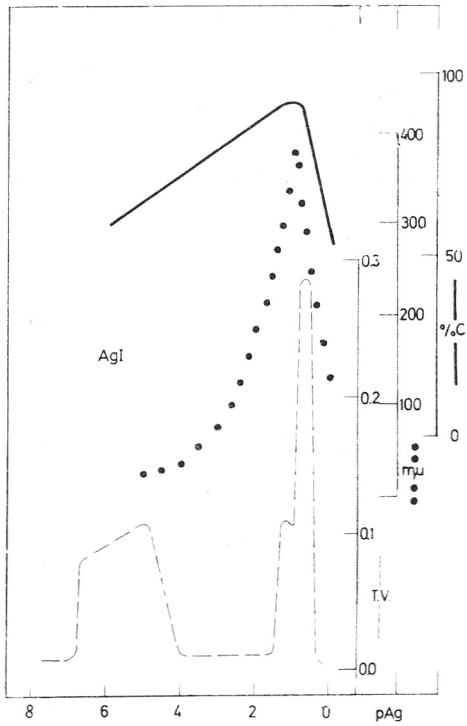

Fig. 2. Curve of turbidity. T. V. (dashed line), sizes of AgI crystallites, millimicrons mμ (dotted line) and the percentage, % C, of the cubic silver iodide, plotted against pAg.

REFERENCES

1. R. Despotović and Z. Grabarić, *Tenside* **8** (1971) 313.
2. R. Despotović, Z. Despotović, M. Jajetić, M. Mirnik, S. Popović, and Ž. Telišman, *Croat. Chem. Acta* **42** (1970) 445.