DCC-22 (Univ. Zagreb)

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Hydrolysis and Precipitation of Uranium (VI) in the System: Uranyl Nitrate — Potassium Hydroxide — Neutral Electrolyte

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The ppts. of potassium uranates are formed in water solns. of uranyl nitrate and potassium hydroxide. The ratio of hydroxide to uranium, characteristic for appearance of first ppt., depends upon initial concn. of uranyl nitrate, leading to various products. The content of potassium in the ppt. increases with increasing hydroxide to uranium ratio, the final product being potassium diuranate. It is found that there is a narrow concn. range of uranyl nitrate where a pptn. min. can be observed. This is attributed to the existence of negatively charged colloidal particles.

The presence of neutral electrolytes: potassium, calcium, strontium, barium and europium nitrate, reduces the colloidal stability of the system: uranyl nitrate — potassium hydroxide, thus causing the pptn. of the corresponding uranates, At molar ratio of potassium hydroxide to uranyl nitrate from 2.0 to 2.5, heptauranates are formed. The soly. product constant of potassium heptauranate is calcd. as log $K_{S_0} = -23.5 \pm 0.4$. By further increase of the ratio hydroxide to uranium, higher uranates up to diuranates are formed.

A probable mechanism of formation of the uranates is proposed, according to which the neutral electrolytes display simultaneously coagulation and constitution effects.

By electron microscopy it has been shown that the formed ppts. have colloidal structure. By aging microcrystalline structures are obtained.

Uranates are hydrated; by NMR method it is shown that the ppts. of potassium and barium uranates contain water partly in form of crystallization and partly in form of chemical water (hydroxyl groups). The ratio of crystallization to chemical water depends upon the initial concn. ratio of pptn. components. Hydroxyl groups have the property to exchange protons for cations from solns.

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Examiners: Prof. B. Težak, Prof. H. Iveković, and Dr. M. Branica

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1. Hydrolysis and Precipitation of Uranium (VI) in the System: Uranyl Nitrate-Potassium Hydroxide-Neutral Electrolyte

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Conductometric Titration, of Barium
Polarography a. c. and d. c., of Potassium
Uranates of K, Ca, Sr, Ba, Eu
  — precipitation of
  — microscopy of
  — mixed Crystals of
Uranium (VI), Continous Extraction by Tetrahydropyrane

MCC-22

Master of Science Thesis

Croat. Chem. Acta **38** (1966)

Polarographic Behaviour of Indium in Aqueous Solutions of Acetylacetone

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D. c. and a. c. polarographic behaviour of indium (III) in aqueous solns. of various concns. of acetylacetone (0.003—0.5 *M*) and in the *pH*-range from 0.7 to 7, was studied. The stability constants were evaluated from the dependence of d. c. and a. c. polarographic current upon the free ligand concn. and compared with constants obtained from the shift of the half-wave potential.

The mean values of constants log $K_1 = 8.8$, log $K_1K_2 = 16.3$ and log $K_2K_3 = 13.3$, were calcd. from d. c. and a. c. polarographic currents; and log $K_2 = 7.3$, log $K_3 = 6.2$, log. $K_2K_3 = 13.3$, from the shift of the half-wave potentials.

Examiners: Prof. B. Težak, Prof. I. Filipović, and Dr. M. Branica.

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1. Polarographic Behaviour of Indium in Aqueous Solutions of Acetylacetone

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Complexes
2,4-Pentanedione, complexes with indium (III)
Polarography a. c. and d. c.
Stability constants, evaluation of

MCC-23

Master of Science Thesis

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Flocculation and Stabilization Effect of Quinine Sulphate on Silver Iodide Hydrosol *In Statu Nascendi*

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The action of quinine sulphate on the pptn. of silver iodide in aq. medium is investigated. Using the tyndallometric technique it is found that for quinine sulphate the crit. concns. of flocculation increase from approx. 2×10^{-6} to 1.3×10^{-5} *N*, and the crit. concns. of stabilization from approx. 4×10^{-5} to 3×10^{-4} *N*, and that they are dependent on both the increase in the silver iodide concn. (from 1×10^{-4} to 1×10^{-3} *M*) and the sodium iodide excess (from 1×10^{-6} to 1×10^{-2} *M*). In the region of stabilization, quinine sulphate reverses the negative sol to a positive one. It's action on the positive sols is also stabilizing. Univalent and divalent quinine exhibit approx. equal behaviour in their interaction with silver iodide sol. The results of the observed phenomena indicate that the adsorption ability of quinine sulphate is of primary and its ionic-coulombic action of secondary importance.

The combined action of quinine sulphate and the non-ionic surface-active compound *Triton-x-305* on silver iodide sol is also examined. It appears that the process of flocculation and stabilization of the sol is, in this case, mainly governed by the action of Triton, due to its greater adsorption ability.

Examiners: Prof. B. Težak, Dr. R. Wolf, Dr. M. Herak.

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1. Flocculation and Stabilization Effect of Quinine Sulphate on Silver Iodide Hydrosol *in Statu Nascendi*

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Adsorption
Quinine Sulphate
Silver Iodide, flocculation of
    precipitation of
Tritone-X-305
Tyndallometry