



STUDY ON NEW COMPLEX COMPOUNDS OF Ti(IV) AND Zr(IV) IN AQUEOUS SOLUTIONS: SYNTHESIS, STABILITY AND APPLICATION IN CLEANER TECHNOLOGIES OF NATURAL LEATHER

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Abstract

In this paper, the study of synthesis and stability in aqueous solutions of new coordination compounds of Ti(IV) and Zr(IV) with ligand N-hydroxy-succinimide is presented. The salts: $TiOSO_4 \cdot 2H_2O$ and $ZrOCl_2 \cdot 8H_2O$ used for obtaining the studied coordination complexes, can derive from recycling metallic residues resulted in mechanical technologies applied for titanium and zirconium in S.C. ZIROM S.A. Giurgiu.

The new complexes were synthesized in aqueous solutions and stability were study using specific methods for coordination compounds: UV-VIS spectroscopy, conductance and pH-metric measurements.

The molar ratios between central atom and ligand and also the partial and total equilibrium constants have been determined, applying the specific methods for study in aqueous solutions. From experimental data resulted that in aqueous medium, two complex compounds are obtained for each central atom Ti(IV) and Zr(IV). The metallic ion is bonded with one and respectively two ligands derived from N-hydroxy-succinimide. The obtained compounds are: [dihydroxo-N-succinimide, diaqua Ti(IV)] sulfate; [dihydroxo-di-N-succinimide Ti(IV)]; [dihydroxo-N-succinimide, diaqua Zr(IV)] chloride and [dihydroxo-di-N-succinimide Zr(IV)].

In strong acidic or alkaline media, the complex compounds are instable. The optimal stability of the studied compounds is between the values of pH: 1÷5.5; these are identical with the acidity of the tanning bathes for natural leathers. This fact is favorable for the use of these compounds as a desirable alternative in ecological tanning processes. The importance of this paper consists in studying and obtaining of new soluble and stable in aqueous solution products that can be used in ecological tanning technologies for natural leather as a replacement for the toxic chrome compounds. In adding, a way of using the residues of titanium and zirconium derived from mechanical industrial processes of these metals is also of economical importance. From these residues, sulfates, chlorides or complex compounds can be obtained determining the necessary quantities of these metals for our country.

Key-words: complex compounds of Ti(IV) and Zr(IV); ecological tanning; chrome compounds replacing in tanning process

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