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ENHANCEMENT OF SEPARATION PERFORMANCES OF A NEW AZOIC DERIVATIVE FROM INDUSTRIAL WATER AND THE POSSIBILITY TO RECOVER ITS COMPLEX AS NANOMATERIAL

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Abstract

In order to obtain new complexes of Fe(III) with multiple uses, their characteristics, important applications and also the obtaining conditions are studied. The obtaining conditions consist in mixing solutions of the same concentrations of ligand 2 amino-6-methoxy-benzothiazole sulphonic acid→1-naphtol-4-sulphonic acid with FeCl₃. The solutions are mixed in molar ratios of 1:1, 2:1 and 3:1 (ligand to central metallic atom). For determining the molar ratio ligand:central metallic atom, the methods applied were: pH-metry, conductometry, UV-VIS spectrophotometry. Also, the stability constants for new obtained compounds were determined using Molar Ratio method (J.H.Yoe and A.L.Jones), Continuous Variation method (Job) and Harvay-Manning method. The stability of the new obtained compounds is studied by varying the pH of its solution. The values are $K_1 = 2.56 \cdot 10^6$ L/mol for FeL₁; $K_2 = 19.76 \cdot 10^{13}$ L/mol for Fe L₂ and $K_3 = 30.03 \cdot 10^{32}$ L/mol for Fe L₃. The higher value for stability is assigned to the compound with molar ratio 3:1 (ligand: metal) in the 1.5÷6.5 pH range. The maxim value for the absorbance was measured at $\lambda_{max} = 601$ nm for FeL₁, $\lambda_{max} = 601$ nm for FeL₂ and respective $\lambda_{max} = 600$ nm for FeL₃. The studied complexes are very stable in the above-mentioned pH range and could be used for spectrophotometric determination of Fe(III) in visible domain. Another practical importance is represented by wastewater treatments by membranar separation. Thus, the separation process is improved by increasing the volume of these complexes in comparison with both ligand and Fe(III) and further the iron recovery by calcinations was accomplished.

Key words: 2 amino - 6 methoxy - benzothiazole sodium sulphonate→2-naphtol-6- sodium sulphonate as ligand, Fe(III) complex compounds, Fe₂O₃, purifying method through membrane, UV-VIS spectrometry

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