STUDY OF COMPLEX FORMATION OF POLYDENTANT LIGANDS WITH COPPER IONS IN AQUEOUS SOLUTIONS

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From the point of view of extraction of toxic metals out of natural and drain water macromolecular complexing ligands belonging to the category of poliampholites have become of a great interest. There is some information in specific literature /5/ about hydrodynamic, conformational, molecular characteristics of poliampholites, forms of macromolecules in solution and processes of chelation with different metals.

Polyelectrolyts poly-2 – metil-5 – vinilpiridin (PMVP) and copolymers 2-metil-5- vinilpiridin with acril acid (MVP – AK) with different ratio of monomers that had been chosen as the subject of the research, refer to the vast category of polyampholites with atomic of nitrogen in the side-cut chain. Those polymeric molecules differ by the high local density of ionogen groups, that possess ligands’ qualifications. For the estimation of the influence of specific interaction between the neighbor chains of polyelectrolyts, there were made a research of how polybasis of PMVP clearly, and copolymers MPV –AK at the ratio of monomers MPV: AK equal 40:60 and 25:75 (%).

Research of the chelation of polyligands with Cu (II) had been made in water environment by (01 mol/l KNO₃ spectrophotometrical and pH-metrical methods at 25 C. There have been got the spectrum of absorption of the solutions of Cu (II), of polyligand, and the system of Cu (II) – of polyligand in ultraviolet and visible fields of the lengths of the waves.

Polymeric ligands demonstrated optical activity only in UV fields, but maximum of light absorption of ions of copper – 810 nm. The presence of ligands together with the ions of copper leads to increase of intensity of light absorption in UV fields in the field of maximum of light absorption of ions of copper and also to the slight hypsochrome move. For the system of Cu(II) – PMVP by method of steady changes, the staff forming of complexformation is identified.

It is determined, that at least when some small additives of PMVP in quantitave ratio are added, just immediately complex with ions of copper is formed, that corresponds to maximal coordinational number of ion of metal for similar fusions – 1:4. It shows high local concentration of donor atoms of nitrogen through polymeric chain of polybasis of poly-2-metil-5- vinilpiridin.

For the estimation of the influence of the specific interaction between the neighbor links in a chain of poliampholite on complexforming ability there were copolymeres of 2-metil-5-vinilpiridin and acril acid in a such ratio were studied, when one of the monomers is in excess and in polymeric chain isolated ionogenic groups are formed.

Since in the system of Cu(II)- MVP –AK with the ratio of monomers 40:60 (%) accordingly, there formation of complexes with the coorelation of metal and ligand 1:2 is determined. This change of the staff of the complex we can explain by isolation of donor nitrogen possessing groups in the polymeric chain, that is by decreasing of their local concentration. At the same time demonstration of mutual electrostatic influence of acidic and basic groups of copolymere when increase of substance of links of AK could raise the constant of ionization of the second component of copolymer, exactly saying, of piridin group is not excluded.

Formation of complexes in the systems of Cu(II) – PMVP, Cu(II)- MVP- AK is confirmed by pH-metrical method.