

EXTRACTION OF OXOANIONS FROM ALKALINE SOLUTIONS WITH QUATERNARY AMMONIUM BASE SALTS.

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Quaternary ammonium base (QAB) salts belong to anion exchange extracting agents. They are able to extract anions and anion complexes of metals from either acidic or alkaline solutions, which allows to use them when isolating carrier-free radionuclides from irradiated nuclear targets.

This paper contains data on extraction of ReO_4^- , TcO_4^- , WO_4^{2-} -ions from alkaline solutions with tetraoctylammonium bromide and mutual influence of ReO_4^- , MnO_4^- , ClO_4^- , TcO_4^- -ions, as well as double-charge oxoanions, on extraction with QAB salts in various solvents (benzene, nitrobenzene, dichlorethane, blend of nitrobenzene and benzene, etc). The exchange constant values of oxoanions for the counter ion of QAB were calculated and selectivity series for single- and double-charge anions were formulated.

When using dichlorethane, nitrobenzene and its blend with benzene as the solvents for QAB salts, raising of the distribution ratio values of anions was observed in comparison with the benzene and toluene systems. Together with that, the mutual influence of anions on their extraction was considered.

The analysis of the extraction data obtained gave us an idea of partial dissociation of ion pairs in the polar organic solvents. The dissociation of some compounds with the ion of tetraoctylammonium is supposed to be accompanied by the mutual influence of metal oxoanions not only on the organic phase dissociation, but on their extraction as well. To confirm that, we measured electroconductivity values of tetraoctylammonium bromide, perrhenate, pertechnetate, perchlorate, permanganate and tungstate in nitrobenzene and calculated the dissociation constant values of such salts according to Fuoss and Kraus. The values obtained are of the same order ($\cong 10^{-3}$ mol/l), though they are some times different from each other. For the QAB salts with simple anions (bromides, chlorides) the dissociation constant values are one order less.

Based on the researches carried out, there was established that the mutual influence of anions, when extracting, turned out to be a multifunctional dependence. First, the exchange constant values of "competing" oxoanions and the counter ion of the QAB salts differ from each other considerably. Second, changes of the dissociation constant values of such salts in the polar solvents are not so substantial; besides, these changes always come along with those of the exchange constant values.

In the case of isotope generators of $^{99}\text{Mo}/^{99\text{m}}\text{Tc}$ and $^{188}\text{W}/^{188}\text{Re}$ it is rather easy to separate daughter radionuclides from parent ones when applying the anion exchange extraction with the QAB salts.