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INVESTIGATION OF Nb(V) AND Ta(V) STATE IN FLUORIDE SOLUTIONS

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The complexity of the state of Nb(V) and Ta(V) in solutions makes it necessary to apply different ways of investigation. Spectroscopic methods - NMR, IR, and Raman spectroscopy are the most convenient ones for studying solutions of high metal concentration. The Raman spectroscopy method has shown that in strip solutions Nb(V) and Ta(V) from neutral oxygen-donor extractants with solutions NH_4F metals are present in the aqueous phase mainly as complex anions $NbOF_5^{2-}$ and TaF_7^{2-}. When mineral acid is added into the solution the composition of the complexes changes. Much information about complexes of Nb(V) and Ta(V) has been obtained while studying non-aqueous solutions. Data have been obtained proving formation of more complex than in aqueous solutions complexes of Nb(V) and Ta(V) mostly of anion character containing F^-, Cl^-, Br^-, O^{2-} and the solvent molecules in the coordination sphere. When extracting Nb(V) and Ta(V) from fluoride media with neutral oxygen-donor extractants by NMR ^{19}F and IR spectroscopy methods it has been established that in organic phase metals are present as complex acids $HMeF_6$. Fluoride solutions Nb(V) and Ta(V) are stable in a wide range of ligand and metal concentrations. All this makes the fluoride system the most suitable for Nb(V) and Ta(V) extraction and separation.