

The Features of Pyrocatechol Violet Complexation with Mo(VI) and W(VI) in solutions. The Spectrophotometric Determination of Mo(VI) in Multivitamins

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The conditions of an interaction of molybdenum(VI) and tungsten(VI) with pyrocatechol violet (PCV) have been studied and optimized. The PCV complexation with Mo(VI) and W(VI) takes place in the pH range of pH 1÷4 (pH opt 1.5 and 1.1 respectively). The composition of the complexes of Mo(VI) and W(VI) with PCV in binary systems is 1:1 and the molar ratios of light absorption have been calculated ($\epsilon_{550}=14000$ and $\epsilon_{555}=15000$, respectively). In the presence of cetylpyridinium bromide (CPBr) it was observed bathochromic shift of the absorption bands of complexes, which is associated with the formation of ion associates. In the ternary systems maximum yield of colored products is observed at pH 4.3, Mo(VI) and pH 4.0 for W(VI). The ratio of components in ternary systems «Mo(VI)/W(VI)-PCV-CPBr» is 1:1:2. The mechanism of Mo(VI) and W(VI) complexation with the PCV has been suggested based on the spectrophotometric data aggregate. The binary and ternary systems the coordinating particles are cations $\text{MoO}_2(\text{OH})^+$ and $\text{WO}_2(\text{OH})^+$, and the PCV reacts by dissociating of sulfogroup form. In ternary systems cetylpyridinium cation involved in the formation of ion associates due to their electrostatic interaction of with sulfo and hydroxy groups of PCV. The molar absorbance coefficients of ionic associates «Mo(VI)-PCV-CPBr» and «W(VI)-PCV-CPBr» are equal $\epsilon_{670}=57000$ and $\epsilon_{670}=61000$, and Beer's law is observed in the concentration range of 0.3-25 $\mu\text{g}/\text{mL}$ and 0.2-23 $\mu\text{g}/\text{ml}$, respectively.

Keywords: complexation, spectrophotometry, pyrocatechol violet, molybdenum(VI), tungsten(VI), cetylpyridinium bromide