

Figure 5 SEM micrographs of copper(II) acetate-PVA complex.

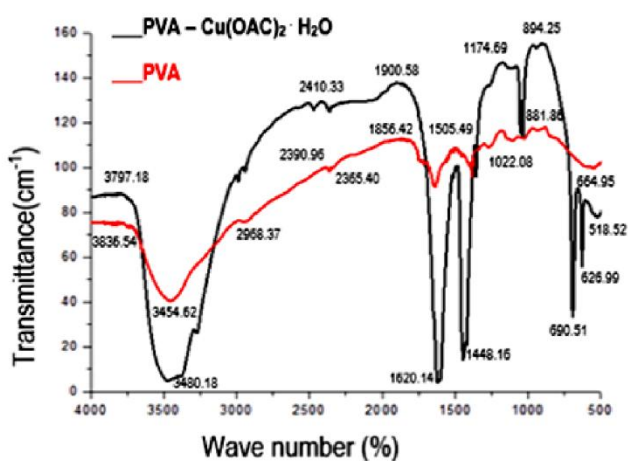
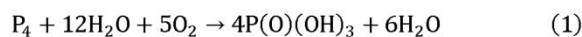


Figure 6 IR - spectra of PVA and PVA - Cu(OAc)₂·H₂O.



The results of the oxidation reaction studies at 60 °C were presented in the mole ratio of the reagents [Cu(PVA)₂(OAc)₂]:[P₄] = 1:1; 3:1; 6:1.

During the interaction of yellow phosphorus with aqueous alkali solutions at 50 °C due to poor solubility of phosphorus ($S_{500\text{ }^\circ\text{C}} \sim 3 \cdot 10^{-3}$ g/L) a slow disproportionation reaction takes place with the formation of hypophosphite and PH₃ [24].

Figure 7 shows the typical kinetic curves of P₄ oxidation process in the solution of Cu(PVA)₂(OAc)₂-C₇H₈-H₂O. The reaction proceeds in an unsteady mode. Both the kinetic ($W-\tau$) and the conversion ($W-Q$) curves go through maximum as in the case of non-modified Cu(OAc)₂. The average duration of experiments was 130 minutes. The maximum oxygen absorption rate was observed for the molar ratio of [Cu(OAc)₂]:[P₄] and [Cu(PVA)₂(OAc)₂]:[P₄] of 6:1.

The experiment of the oxidation process with P₄ in the presence of the complex Cu(PVA)₂(OAc)₂ was characterized with the maximum absorption rate, in comparison with Cu(OAc)₂·H₂O.

The reaction conditions and product yield of P₄ oxidation by O₂ with Cu(OAc)₂·H₂O and Cu(PVA)₂(OAc)₂ in aqueous-organic solutions are presented in Table 3.

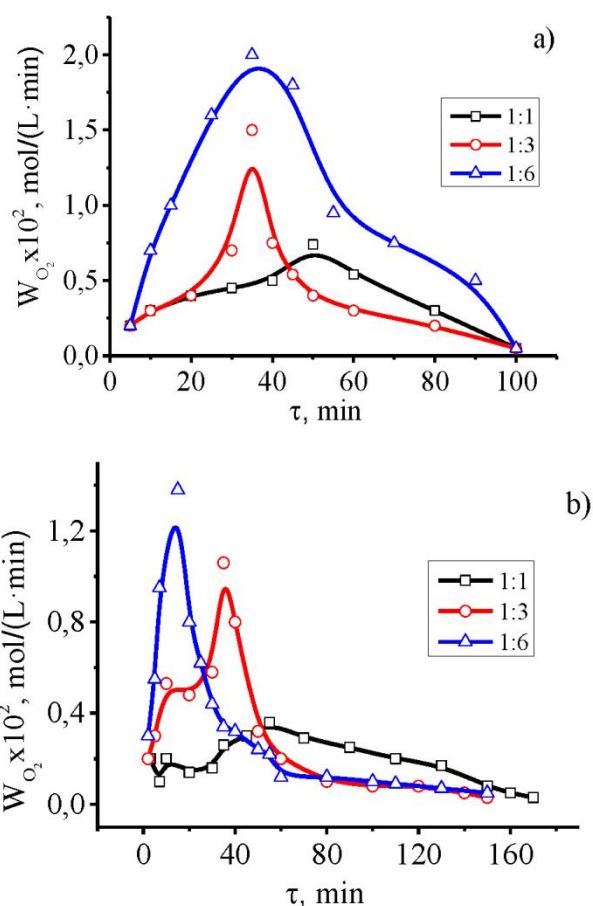


Figure 7 The kinetic curves ($W-\tau$) of the oxidation process of P₄ with oxygen in aqueous-organic medium in the presence of Cu(OAc)₂·H₂O (a) and Cu(PVA)₂(OAc)₂ (b) complex. Reaction conditions, mol/L: [P₄] 1.07; [H₂O] 50; [C₇H₈] 0.94; 60 °C; [Cat]: 1 - 0.01; 2 - 0.03; 3 - 0.06.