QUANTITATIVE DETERMINATION OF POTASSIUM HYDROGENPEROXOMONOSULFATE BY VOLTAMMETRY AT CARBOSITALL ELECTRODE

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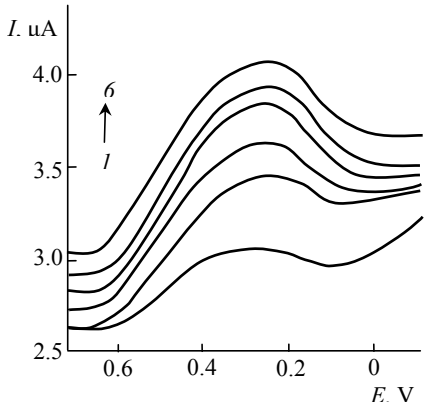
Potassium hydrogenperoxomonosulfate ($KHSO_5$, PMS) in the form of stable potassium salt $2KHSO_5 \cdot KHSO_4 \cdot K_2SO_4$, known as Oxone™, is widely used in agriculture and medicine as a disinfectant, antiseptic and sterilizing agent.

The aim of the research was to determine the feasibility of the method of quantitative determination of PMS by cathodic voltammetry using carbositall electrode (CE) (Russia) as indicating (working) electrode. Electrochemical measurements were carried out in the analyzer ABC-1.1 (Volta, St. Petersburg) with a three-electrode scheme by alternating current mode with square wave modulation in potential range +1.0…–1.2V, W=1000rpm, amplitude 40mV, ν=65Hz. CE was used as a working and an auxiliary electrode, and Ag,AgCl/KCl(sat) electrode type EVL-1M4 as a reference electrode.

The peak was obtained at E_p=+0.25V on the background of 0.2mol L^{-1} $KHSO_4$ (pH≈0.8), whose height was rising proportionally to PMS concentrations increasing.

Equation of PMS reduction on working electrode is $HSO_5^- + 2e + 2H^+ = HSO_4^- + H_2O$.



c ($KHSO_5$), 10^{-5}, mol L^{-1}: *1* – 0.9; *2* – 1.8; *33* – 2.7; *4* – 3.6; *5* – 4.5; *6* – 5.4; pH≈0.8(background – $KHSO_4$, *c*=0.2mol L^{-1}); E_p=+0.25V(Ag,AgCl/KCl sat)

Linear concentration ranges of PMS varied from $(0.9–5.4)\times10^{-5}$mol L^{-1} is $I_p=(8.4\pm2.0)\times10^3\times c+(0.2\pm0.1)$(r=0.992); limit of detection is 8×10^{-6}mol L^{-1}. For $(3.6–5.4)\times10^{-5}$mol L^{-1} PMS *RSD*=(2.9-2.65%)(*n*=5;P=0.95%). Thus, new voltammetric method of PMS determination in aqueous solutions using CE (glassy carbon) electrode as indicating (working) electrode was developed and the possibility of its quantitative determination was shown.