KINETICS OF COCENTRATION POLARIZATION PHENOMENA FOR MICROBIAL CELLULOSE MEMBRANE

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One of the interesting polymer material, used in medicine is the microbial cellulose, formed biosynthetically by the bacterium *Acetobacter xylinum*. This polymer is used as a membrane dressing to heal burns and tibia ulceration. This membrane, as most of selective membranes, paticipates in concentration polarization phenomena, which leads to creation of concentration gradients in solutions near membrane surfaces called *Concentration Boundary Layers* (CBLs). CBLs modify osmotic and diffusive flows and membrane potentials.

The kinetics of concentration polarization phenomena was characterized by measurements of voltage between Ag|AgCl electrodes, placed on both sides of the membrane. Time characteristics of voltage for membrane mounted in a horizontal plane and NaCl solutions with higher concentration under (configuration A) and over (B) the membrane were measured. The voltage after turning off mechanical stirring of solutions was measured every 4 seconds during 5 hours. For small quotient of concentrations on the membrane at the initial moment ($C_hC_l^{-1}$) the differences between time characteristics for A and B configurations were very small. For $C_hC_l^{-1} > 25$ and A configuration, after turning off mechanical stirring the monotonic decrease of voltage was observed, which shape depended on changes of concentrations near membrane and electrodes surfaces. Such time characteristics of voltage demonstrate diffusionnal character of CBLs buildup. For B configuration decrease of voltage in the first few minutes after turning off mechanical stirring of solutions, connected with concentration changes near membrane surfaces was the same as for A configuration. After that time, for $C_hC_l^{-1} > 25$ the pulsations of voltage were observed, as a result of hydrodynamic instabilities in CBLs, caused by sufficiently great density gradient in CBLs, running in opposite direction to the vector of gravitational field.