

The effect of junction potential and analyte concentration for the ion-transport number of cation-exchange membranes

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The accurate transport numbers of sodium ion with respect to permselectivity with various cation exchange membranes were evaluated for various concentration differences of NaCl solutions using two Ag/AgCl single junction electrodes. To evaluate the effect of junction potential of the single junction electrodes for the determination of membrane potential, the junction potential differences using NaCl solution in the range of 0.01 - 1 M were verified. The junction potential differences for each concentration of NaCl solution showed to be reasonable within -1.54 to 3.47 mV over 0.05 mV. Regardless of the characteristics of membranes, the hypothetical junction potential differences caused by the membranes were close to 0 mV, except for 0.01 M, despite the varying the concentration of the NaCl solution. When measuring the membrane potential between two solutions with different concentrations, we found that stirring of the solution is essential for accurate potential. Especially in the low concentrated solution, the apparent potential value was distorted because the diffusion boundary layer was formed at the interface of the electrode and the membrane while the solution was not stirred.