Abstract

In this final project an isntrument has been built to study the diffusion coefficient of NaCl through KOH activated nanopore carbon layer. Diffusion coefficient calculation is conducted by using Fick's principle which formulates the relation between changes of concentration as a function of time and the diffusion coefficient. In this study, we observed a linear relation between conductivity and concentration. Hence, we built an instrument which consists of container filled with pure water, a container filled with 0.5 mol/l NaCl water, a nanoporous membrane seperating above mentioned container, and electrical conductivity measurement system with arduino microcontroller for real time monitoring of conductivity changes in the pure water filled container. We found that the diffusion coefficient for 1 mm thickness of nanoporous carbon membrane is 6.59 x 10^{-5}, while they are 4.69 x 10^{-5}, and 2.30 x 10^{-5} for 2 mm and 3 mm thickness repectively. These difference value of diffusion coefficient might due to the presence of defects. The Na and Cl ions might have more obstacles when they pass the thicker sample.

Keyword: coefficient diffusion, conductivity, concentration, nanopore carbon