The values of activation energy required for the diffusion of ZnCl₂ and for Cd²⁺ ions in Cd/Ac/ are reported in agar gel medium at 5x10⁻⁵ and 0.001M concentration, respectively. These values are compared with the previously reported values in the same systems at different concentrations. The decrease in activation energy with concentration of electrolyte is in agreement with the Wang's model.

INTRODUCTION

In a series of papers¹⁻⁵ we have reported the tracer-diffusion coefficient values at various concentrations of the electrolyte. The diffusion coefficient-concentration curves in these systems always show a rise in diffusion coefficient after certain concentration. This increasing trend in diffusion coefficient was explained on the basis of Wang's model⁶. According to Wang's model, as the concentration of electrolyte increases, ion-ion in-


ELECTROLYTE DIFFUSION OF ZnCl₂ AND SELF-DIFFUSION OF Cd²⁺ IONS IN AGAR GEL MEDIUM AT DIFFERENT TEMPERATURES

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Received 9 July 1984
Accepted 23 July 1984
interactions become predominant leading to an increase in the self-energy of the ions in the ground state while that in the excited state remains unaffected resulting into a reduction in the total energy barrier for diffusion. If this picture is correct, the activation energy for the diffusion process should decrease with increasing concentration of the electrolyte. The present work is undertaken with a view to verify the Wang's model by determining the activation energy for the processes of electrolyte diffusion of ZnCl$_2$ /$5\times 10^{-5}$M/ and self-diffusion of Cd$^{2+}$ ions in Cd/Ac$_2$/0.001M/ at a concentration different than that reported earlier$^7,^8$ by us in the same systems.

EXPERIMENTAL

The electrolyte diffusion of ZnCl$_2$ /$5\times 10^{-5}$M/ labelled with $^{65}$Zn and self-diffusion of Cd$^{2+}$ ions in Cd/Ac$_2$/0.001M/ labelled with $^{115}$Cd were studied in 1.5% agar gel. The diffusion coefficients were measured over a temperature range of 25-50 °C using the zone diffusion technique. In self-diffusion measurements, the central zone contains the solution of labelled electrolyte and columns on both sides of it contain solution of unlabelled electrolyte in agar gel. On the other hand, in case of electrolyte diffusion, only the central zone contains the labelled electrolyte at desired concentration while columns on both sides of it are of pure agar gel without any electrolyte. The detailed procedure for the preparation of column and its analysis had been reported in the previous paper$^9$. 

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