PECULIAR BEHAVIOUR OF IONOGENIC AQUEOUS SOLUTIONS AROUND 4°C

VIANA, C.A.N. e ROCHA, M.M.G.S.

CECUL, Faculdade de Ciências, R. Escola Politécnica, 58, 1294 LISBOA CODEX

Thermodynamic behaviour of ionic and ionogenic solutions is very much dependent on the degree of association of solvent, specially where the possibility of hydrogen bonding exhists.

In particular are well known the peculiar properties of water solution around 3-4°C and also at about 55°C. Such behaviour are in large scale a consequence of the freedom of water molecules which very much is related to the amount of hydration.

Thermodynamics or pseudo-thermodynamics parameters can change dramatically their values with the temperature.

In this work kinetics and thermodynamic properties of benzyl chloride and p-nitrobenzyl chloride in water are studied in the 0-15°C range up to 2000 bar.

A change from negative to positive values of the enthalpy of activation is observed when temperature reaches 4°C at normal pressure. On the other hand, volume of activation presents positive values near the melting point to 2°C on 3°C, depending on the substract. At higher pressures, our systems shows that water tends to behave like a "normal" liquid.

Some results are illustrated in Fig. 1 and Fig. 2.

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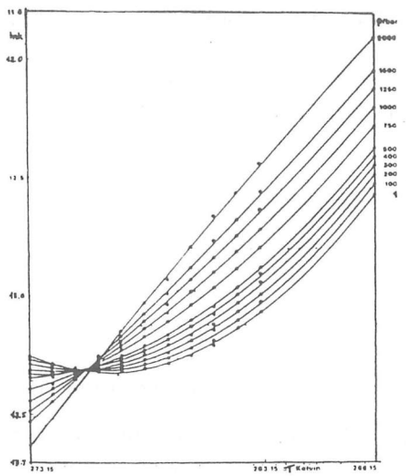

Fig. 1. lnk vs. temperature

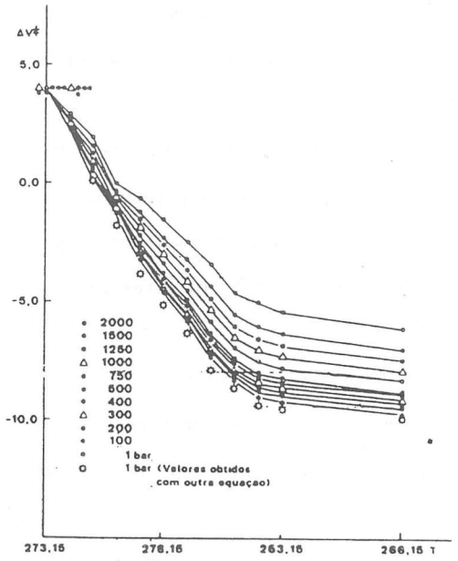

Fig. 2. $\Delta V^{\neq}$ vs T

CEMENTATION OF COPPER ON PACKED BEDS OF ALUMINIUM PELLETS

A.A. Wragg and C.R. Dresner
Chemical Engineering Department, University of Exeter, Exeter, EX4 4QF, England.

Introduction

Cementation, or contact reduction, processes have long been used as electrochemical methods of recovering metal ions from aqueous solutions by spontaneous precipitation on a less noble metal. Recently, the use of aluminium from waste drink cans as a cementing agent for the deposition of copper has been reported [1]. However, as with many other cementation systems, little effective engineering data exists for the design and scale-up of such processes. It was decided to investigate the performance of a bed of aluminium pellets as a substrate for Cu deposition with a view to obtaining mass transfer data for the system. The overall reaction is

$$2Al + 3Cu^{++} \longrightarrow 3Cu + 2Al^{+++} \qquad (1)$$

Experimental

The experimental approach was to recirculate a batch of $CuCl_2$-containing electrolyte through a system incorporating a packed bed cementation reactor and a well-stirred 25l reservoir (Figure 1). This is a similar system to that used by Walker and Wragg [2] in fluidised bed copper recovery studies and by Bravo and Wragg [3,4] in recent cementation studies using the Cu-Fe system. Batches of the $CuCl_2$ solution, acidified to different initial pH values using HCl, were continuously recycled and small samples were taken from the reservoir for analysis of the copper and aluminium content at different times. The initial Cu^{++} content was $\approx$ 600 ppm.