electrochemical study on al in aqueous media

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The introduction included a literature survey of the different theories of corrosion and corrosion inhibition. The corrosion of aluminium in aqueous solutions (acidic, alkaline and neutral) was given with particular emphasis on the effect of aggressive as well as inhibitive anions.2- The anodic and cathodic Tafel lines were constructed for aluminium in oxalic acid solutions. This was made to elucidate the effect of acid concentrations on the kinetics of the dissolution of aluminium in oxalic acid solution studied. Increasing of acid concentration was accompanied by an increase in the corrosion current density.3- The effect of addition of different concentrations of surfactant compounds were studied in 0.1M oxalic acid solution. This show thata-As the concentration of surfactant compounds increases the corrosion current density decreases and inhibition efficiency was increased.b-The decrease in percentage inhibition efficiency is in the follwing order:Compound III > Compound II > Compound I.4- The effect of increasing concentrations of polymeric compounds on the anodic and cathodic polarization curves of aluminium was examined in 0.1M oxalic acid solution, it was found that:Summary and Conclusionsa-In the concentration range 50 to 400ppm, as the concentration increases the corrosion current density decreases and consequently the percentage inhibition efficiency increases.b-In concentration more than 400 ppm the corrosion current density increases as the polymer concentration is increased and consequently the percentage inhibition efficiency decreases.c-The percentage inhibition efficiencies obtained by compound (VI) are higher than those obtained by compound (V) in all studied concentrations.5-The effect of temperature on the dissolution of aluminium in 0.1M oxalic acid was studied. As the temperature is raised it was found that, the corrosion potential is shifted to more negative value and the corrosion current density is increased denoting the acceleration of corrosionprocess.6-The effect of temperature on the dissolution of aluminium in 0.1M oxalic acid in presence of 800ppm of additives (I to III) and 400ppm of additive (IV to V) respectively was studied and reveals that:a-As the temperature is raised the corrosion potential shift to more negative values.b-The corrosion current density is increased.c-The percentage inhibition efficiency decreased.Summary and Conclusions7-Some activation thermodynamic parameters such as change of free energy of activation, change of enthalpy of activation and change of entropy of activation were calculated using the transition state theoryrelation.8-The effect of halide ions e.g. (Cr, Br” and n on the potentiodynamic anodic polarization curves of aluminium in 0.2M oxalic acid solution was studied. Increasing the halide ion concentrations causes the current following along the passive region to increase suddenly and markedly at some definite potential denoting the destruction of the passivating oxide film and the initiation of visible pits. The effect of increasing the halide ions content is the shift of the pitting potential of aluminium electrode into the active (negative) direction.9-The potentiodynamic anodic polarization curves of aluminium in 0.2Moxalic acid + 2x 103 M NaCI was studied in absence and in presence ofdifferent concentrations of surfactant compounds. It is shown that, as theconcentration of surfactant compounds was increased the pitting potentialshifted to more negative direction.10-The effect of different concentrations of polymeric compounds on the potentiodynamic anodic polarization curves of aluminium in 0.2M oxalic acid + lx104 M NaC1 was studied, it was found thatSummary and Conclusionsa-Increasing the concentration of polymeric compounds up to 400 ppm causes a marked shift of pitting corrosion potential into the noble direction. This shift indicates an increase resistance to pitting Macke.b-At higher concentration more than 400ppm of the polymeric compounds, there is a shift of pitting corrosion potential into active direction. This shift indicates that the resistance to pitting corrosiondecreases.