C- RESULTS

For copper electrode: The electrochemical behaviour of copper electrode in sodium hydroxide solutions was studied using cyclic voltammetric technique. Fig. (2) shows the result of three complete sucessive cyclic voltammograms for pure copper electrode swept from -1.5 V (SCE) to oxygen evolution potential, at a voltage scan rate of 25 mV/sec. in 0.5 M NaOH solution at 25°C.

Figs (3 and 4) represent the cyclic voltammograms obtained for copper electrode where the direction of potential scan was reversed at various selected anodic potentials, in 0.5 M NaOH solution at voltage scan rate 25 mV/sec.

The curves of Fig (5) show the behaviour of copper electrode in solutions of sodium hydroxide of various concentrations ranging between 0.4 M to 0.8 M, reported between the hydrogen and oxygen evolution potentials, at a voltage scan rate of 25 mV/sec. Fig (6) shows the plot of (Ep) verus the logarithm of sodium hydroxide concentration for peak (C) of Fig (5). Curves of Fig (7) show the effect of sodium hydroxide concentration on the anodic polarization curve of copper electrode at voltage scan rate of 1.0 mV/sec. Fig (8) represents the plot of (Ep) versus (log C_{OH^-}) for both peaks (B) and (C) of Fig (7). Fig (9) shows the relations between peak currents (i_P) versus molar concentration of sodium hydroxide on double logarithmic scale for peakes C,E,F and G of Fig (5).

Fig (10) represents the CV's of copper electrode in 0.5M NaOH solution obtained between hydrogen and oxygen evolution potentials at varying voltage scan rates ranging between 5 and 100 mV/sec. The relationship between peak current values (i_p) and the scan rates is shown in Fig (11), whereas the relationship between peak potential (Ep) and logarithm of voltage scan rate is given in Fig (12) for the peaks B, C, F and G of Fig. (10).

For Nickel Electrode: Three complete successive cyclic voltammograms obtained for pure nickel electrode in 0.5M NaOH solution between the hydrogen and the oxygen evolution potentials at voltage scan rate 25 mV/sec. at 25°C are shown in Fig. (13a). The effect of reversing the direction of potential sweep at various specific potentials on the CV's is represented in Fig (13b).

CV's for pure nickel electrode in different concentrations of sodium hydroxide solutions, obtained at voltage scan rate of 25 mV/sec. are shown in Fig (14). The double logarithmic relationship between the dissolution current density (i_p) for peaks A_1, A_2 and C_1 of Fig (14) and molar concentration of sodium hydroxide solution are presented in Fig (15). Curves of Fig (16) represent the relationship between peak potential (Ep) for peaks A_1, A_2 and

C_1 of Fig (14) versus log C_{OH^-}.

Figs (17, 18 and 19) show the effect of voltage scan rate on the cyclic voltammograms of nickel electrode in 0.1, 0.5 and 1.0M NaOH solutions, respectively. Fig (20) show the relationship between the anodic peak potentials of peak (A_1) and square root of voltage scan rate. Fig (21, 22 and 23) show the relation between peak current (i_p) for peaks A_1, A_2 and C_1 in 0.1, 0.5 and 1.0M NaOH solutions resectively.

Fig (24) represents the relationship between the appearent surface resistance of nickel electrode and molar concentration of sodium hydroxide solution for peak (A_1).

The relationship between the plateau current densities (i_ν) and the voltage scan rate (v) in various molar concentration of sodium hydroxide is shown in Fig (25) wherease Fig (26) represents the plot between (U/i_ν) and ($\log\nu$).

For copper-Nickel Electrode: Figs (27, 28 and 29) represent the CV's for the three copper-nickel alloys (I, II and III) respecteiely, where the direction of potential scan was reversed at various selected anodic potentials in 0.5M NaOH solution at scan rate 25 mV/sec. at 25°C.

Fig (30) represents the CV's of the three alloy electrodes in 0.5M NaOH solutions at voltage scan rate 25 mV/sec, whereas Fig (31) represents the CV's for pure copper and nickel electrodes at the same conditions.

Figs (32, 33 and 34) illustrate the effect of different sodium hydroxide solution concentrations on the cyclic voltammograms of the three copper-nickel alloys (I, II and III) at a voltage scan rate of 25 mV/sec and at 25°C.

Figs (35, 36 and 37) represent the CV's of alloys I, II and III in 0.5M NaOH solution obtained at different voltage scan rates. The relationships between the peak current densities and voltage scan rate on double logarithmic scale for alloys (I & II) are shown in Figs (38 and 39) respectevely. Figs (40 and 41) represent the variation of peak potential values with the logarithm of voltage scan rate for alloys (I and II) respectively.