CHAPTER 4

CONCLUSION

4.1 Cyclic Voltammetry

Contamination of bath solution with chloride ion due to the Ag/AgCl reference electrode used has a great influence in the experiment. Although it is proven that Cu^{2+}/Cu couple is a reversible reaction, but the voltammograms obtained from cyclic voltammetry did not exhibit the reversible behaviour. This is due to the oxidation of the reduced cuprous ion by chloride ion and tends to reduced the peak currents in the voltammograms and account for some deviation from the Randles-Sevcik equation.

The addition of glycine to the bath solution might not involve in the reduction and oxidation of Cu^{2+}/Cu couple but somehow, indirectly enhance the peak current. This is because there is no difference in the voltammograms obtained for cyclic voltammetry experiment for bath solution with and without additive.

4.2 Plating Process

Oxidation of the polished copper electrode is observed for constant potential plating at -0.100 V and constant current plating at 1.32 A/cm^2, 3.97 A/cm^2 and 6.62 A/cm^2 for the three different bath solution. However the rate of reduction and oxidation of cuprous ion and polished copper electrode respectively is the same, where higher rate is observed at the beginning of the plating process. Until certain periods of time, the rate of oxidation and reduction decrease and reach a plateau stage.

In the plating process, glycine has certain properties that it has increased the potential and current density of the copper deposition and decrease the potential when dissolution of the copper electrode occur. However, there is also an exception when glycine fail to decrease the potential when oxidation of copper electrode occur.

4.3 SEM

Through SEM, the oxidation of the copper electrodes can be identified and are labelled as A1, A6, A7, A8, B1, B6, B8, B10, C1, C6, C8 and C10. The growth mode of the deposit is identified to be block growth and nodules growth. Most of the deposited electrodes show the block growth, but did not have a proper arrangement or geometrical arrangement. Plating at high potential or current density will activate nodules growth. Plating at potential lower then -0.400 V

will encourage the block growth, which is more favourable because electrodeposition of copper is more uniform and have a wider application.

The glycine added seems to inhibit the electrodeposition of copper. This is because the surface morphology is rather random in growth of the deposit and not uniform.