

## SUMMARY

Electroplating is a commercial exploitation of the process of electrodeposition in which a metal (or metals) is deposited on a cathode during the process of electrolysis. Deposition of noble metals like gold and silver, on some low valued base metals was successfully tried by the alchemists and since 1850, electroplating became an established practice and was considered to be an art. However, the experts used to conceal the available information from others, by keeping it in custody with perfect secrecy to preserve professional competence. Thus, the same age-old methods were followed for years together, with practically no modifications ever since. However, with the advent of knowledge and scientific achievements in other fields, the electrochemists became aware of their short-sighted approach and a new era in electroplating of metals and alloys came into reality.

An aqueous solutions, other cations such as  $H^+$ , become the main interference in metal-deposition. Considering the position of noble metals and hydrogen in electrochemical series, the latter cannot be discharged even in strong acidic media because of its high discharge potential as compared to noble metals which can thus be deposited fairly easily on base metal. In presence of other metals which lie above hydrogen in the electrochemical series, it is the hydrogen which would be discharged first and hence

deposition of base metals may appear to be impossible, had it not been for the over-voltage of hydrogen. Adjustment of activities and over-voltages makes it possible to deposit an alloy of any metals of ones choice.

There are various controlling factors such as composition of the bath solution, pH, current density, duration of electrolysis, temperature, inter electrode distance and use of addition agents, which have got to be properly studied to arrive at the optimum conditions for getting a uniform, fine grained and adherent deposit of a metal or an alloy on desired base metal. Thus a careful study of the above factors, makes the art of electroplating, a science based practice.

The first chapter concerns itself with literature survey and basic principles of electrodeposition. Though, lot of work has so far been accumulated on electroplating of metals and alloys, there have been number of neglected parameters and contradictory observations which make it necessary to have either fresh experimentation or to evolve a new bath which would give good quality deposits.

The second chapter is related to experimental and the chapter third, fourth and fifth are related to the main work.

In the present work, the author has selected two metals viz. zinc and Nickel and established conditions to obtain good quality deposits separately, using a bath sulphate-succinic acid which has not been studied before, in the past.

After the study of single metal deposition, it has been shown in the fifth chapter, that co-deposition of the two metals,

zinc and nickel from the sulphate-succinic acid bath can be achieved with desired quality and appearance.

It has been observed that from the bath sulphate-succinic acid single metals viz. zinc, nickel and alloy zinc and nickel can be deposited with good adherency and appearance. This bath gives the fine grained, shining and adherent deposits of nickel and bluish-white deposits of zinc and alloy.