Annexure - VII

UNIVERSITY GRANTS COMMISION
BAHADUR SHAH ZAFAR MARG
NEW DELHI – 110002

File no:- 47907/09(WRO)

PERFORMA FOR SUBMITION OF INFORMATION AT THE TIME OF SENDING THE FINAL REPORT OF THE WORK DONE ON THE PROJECT

1. Title of the project –

APPLICATION OF POLARISATION MEASUREMENTS IN THE STUDY OF BEHAVIOUR OF ADDITION AGENTS DURING ELECTRODEPOSITION OF METALS.

2. NAME & ADD OF PRINCIPLE INVESTIGATOR - Dr. RAJAN V. ANYAPANAWAR.
51, Laxmi – Vishnu society,
kumthanaka,
Solapur – 413003.

3. NAME & ADD OF THE INSTITUTION– Sangameshwar collage,
Sat rasta, Solapur.
413001.

4. UGC APPROVAL LETTER NO & DATE- File no:- 47907/09(WRO)

5. DATE OF IMPEMENTATION – 04/03/2010.

6. TENURE OF THE PROJECT- Two years.

7. TOTAL GRANT ALLOCATED- Rs 1,20,000/-

8. TOTAL GRANT RECEIVED – Rs 98,500/-

9. FINAL EXPENDITURE – Rs 75,000/-

OBJECTIVES OF THE PROJECT-

It is observed that addition agents affect the factors like %CCE and cathode polarization during electro deposition of metals. It is the objective of the present work to offer a scientific base for this process by measuring cathode polarization during the process and to study the effects of addition agents on cathode polarization, weight of deposit and nature of deposit obtained during electrodeposition.

WHETHER OBJECTIVES WERE ACHIVED-

Yes, the developed bath produces good quality deposit over wide C.D. range and temperature range. The effectiveness and ease of operation of this bath depends on the addition agents used in the bath. Data on polarization gives a new insight into the problem.

ACHIVMENTS FROM THE PROJECT-

Adherent and smooth deposits of zinc were successfully deposited on the base metal from this bath. The bath was also characterized by high %CCE. The deposits obtained by using number of addition agents were bright, sound and satisfactory. A detailed explanation has been offered for the various trends observed during the investigation in the light of cathode polarization phenomena.

SUMMERY OF THE FINDINGS –

The term electrodeposition is usually applied to the production of relatively thin, adherent deposit on the surface of cathode (base metal) by sending direct current through a bath solution. Thus relatively thin metallic layer is rendered to impart to the base metal different usually superior surface properties.

Electrodeposited Zinc coatings have some special characteristics which cannot be archived by any other metal at such a low cost. The bath selected is ammonical acetate bath which is non-poisonous and hence eco-friendly. The bath shows good conductivity and produces good quality deposits over wide range of C.D.

In modern electroplating practice, it is well known that the introduction of small amount of certain substances in the bath leads to marked changes in the nature of deposits obtained at cathode. These substances are called additives or addition agents. In present work twelve addition agents both organic and inorganic in nature are selected and studied their influence on deposition morphology, %CCE, and cathode polarization and corrosion resistance to correlate effect of all these factors with each other. A special attention is given to polarization studies, since the additives' function is to alter one and more electrochemical steps of deposition process. It results into some changes in cathode polarization measurements are done during every addition of additives.

The deposits obtained are satisfactory for majority of addition agents. Thus they are smooth and adherent number of additives, brightness increases to considerable extent and hence they act as brighteners. For some addition agents, however they act as impurities and produce non satisfactory deposits, hence they may be called as inhibiters. The satisfactory explanation has been offered for various observations in the light of cathode polarization.

Reviewing these results it is inferred that addition agents are able to produce smooth bright adherent deposit when they undergo electrochemical changes at the cathode surface and are adsorbed on it, thus affect the cathode polarization and retard the grain size of the deposits. Hence uniform deposit growth is possible in presence of additives.

It is astonishing that no direct correlation can be found between polarization changes due to addition of different additives and changes in the morphological structure of deposits. For instance, agar-agar changes the slop of polarization curve to the maximum. The large deviation in polarization may be attributed to a change in the path of electrochemical process from normal one or from a different steps

not known , may be slowing down the rate of deposition , hence the deposit obtained are smooth with reduction in grain size . On the contrary although the deviation in polarization is small for urea, the deposits obtained are satisfactory. More detailed investigation is therefore necessary in order to derive which part of the polarisation curve is really responsible for the metallographic structure of the deposits. Hence it ic concluded that action of addition agents is very specific.

In spite of all these shortcomings, it is a great pleasure to see that the polarisation measurements are now coming in to industrial practice.

CONTRIBUTION TO THE SOCIETY –

Zinc is one of the leading metals dominating the electroplating or electro deposition world. The electrodeposition of zinc is also referred as electrogalvanizing and widely used in automobile industry.

Here the bath used is ammonical acetate bath, which is non-cyanide bath hence is eco-friendly and also with low cost. In the present work efforts have been made to obtain smooth, adherent and bright deposit from this bath by using different addition agents. Further it is observed that the bright deposits obtained show corrosion resistance property. Hence this bath is useful in electroplating industry.