SYNOPSIS

of

The Thesis for the M.Sc. Degree (in chemistry)

to be submitted by

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Title: Part I : Electro-deposition of Tin from acid baths.

Part II: Electro-deposition of alloys of Tin.

Part I

Tin has a pleasing silvery white appearance which it can retain for a long time, thus indicating its high resistance to atmospheric corrosion; hence it is very widely used as a protective coating for iron and steel. Owing to these and other reasons, a detailed quantitative study of electro-deposition of tin from different acid bath solutions is of special interest.

A review of literature shows that much work has been done on the electro-deposition of tin from alkaline and acid baths (Cf. Kern. Trans. Am. Electro-chem. 23, 193, 1913). But baths containing acids other than sulphuric and hydrochloric acids have not been fully investigated into, and very little quantitative information is available.

An attempt has therefore been made in the present investigation to study quantitatively the electro-deposition of tin from the following bath solutions :-

1) A sulphate bath,
2) A chloride-oxalate bath,
3) A chloride-acetate bath,
4) A chloride-acid fluoride bath,

In each case, the influence of the following factors was studied in greater detail, in order to investigate the optimum conditions for the production of smooth, bright and adherent deposits of tin :-

1) Concentration of the electrolyte,
2) Spacing of the electrodes,
3) Current density,
4) Temperature,
5) Duration of electrolysis,
6) Addition agents.

Part II

Electro-deposition of an alloy of two or more metals is of recent origin and is of great interest. Owing to some remarkable properties of alloys of tin, a study of the electro-deposition of tin alloys was thought to be interesting.

A review of the literature shows that very little work has been done on an electro-deposition of alloys of tin. The only alloys commonly mentioned are bronze (Cf.Mathers and Sowder Trans.Am.Electro-chem.Soc., 37, 525, 1920) and the tin-lead alloys (Cf.Field and Weill.Electro-plating.Sir Isaac Pitman,& Sons Ltd.,London.,474, 1951).An alloy of tin and nickel has been deposited from a cyanide bath (Cf.Faust.Trans.Am.Electro-chem. Soc.,78, 383, 1940).

However, no information is available on tin-cobalt alloys. Hence an attempt has therefore been made to study the electro-deposition of tin-nickel and tin-cobalt alloys from chloride-acid fluoride baths.

In each case the influence of the follwoing factors was studied in greater detail, in order to investigate the optimum conditions for the production of smooth, bright and adherent deposits of the alloys:-

1) Concentration of the electrolyte,
2) Temperature,
3) Current density,
4) Duration of electrolysis,
5) Addition agents.

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