

EFFECT OF ORGANIC ADDITIVES ON
PULSED CURRENT PLATING OF CoFe ALLOY
AND CONSEQUENCES ON PROPERTIES OF
DEPOSITS

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The CoFe electrodeposition is a one-step process for the production of magnetic films in order to develop recording heads.. This material is elaborated from classic baths containing organic additives in order to give appropriate properties to the deposit. Organic compounds are then added to the plating baths to alter the surface finish and mechanical properties of electrodeposits. These additives are very diluted and are consumed by mixing in the deposit, anodic oxidation, or cathodic reduction.

A previous study has been undertaken to determine the sensitivity of the presence of sodium saccharin to gain fundamental knowledge of both the deposition and the film characteristics elaborated in direct current.

This work concerns the study of organic additives influence on transient response to a current pulse during the CoFe coating elaboration in pulsed current.

The originality of the study is to find links between elaborate conditions, additives nature and deposit properties such as thickness, composition, roughness and passivation ability of such coatings.

First, main results concern the faradaic range : actually, the presence of organic additives give rise to a larger range : especially, times of double layer charge are shorter when sodium saccharin is added (fig. 1).

In order to point out the various behavior, deposits were elaborated in all the faradaic range.

Alloys composition vary according to the pulsed current conditions and the nature of additives.

In the faradaic range, the iron composition increases when the charge time increases. On the other hand, iron composition decreases when the electrolysis bath contain sodium saccharin.

The experimental conditions can also affect the deposition rate (thickness vary according to pulse current conditions and additives nature) and surface roughness (fig 3) and deposit morphology. As for iron composition, roughness can be discuss according to the elaboration conditions.

The last point of the study concerns the influence of the nature of additive

and pulsed current conditions on the passivation ability of given materials.

Additives and use of pulsed plating deposition allow to decrease surface, but they greatly influence the deposit composition, the deposition rate and the corrosion sensibility.

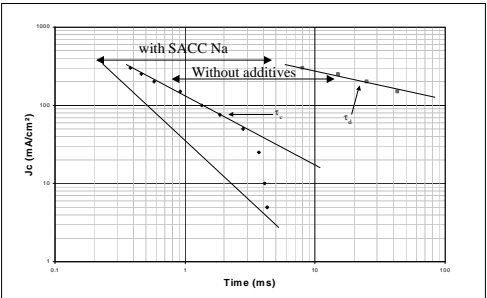


Fig 1 : Faradaic range of CoFe bath without additive and with sodium saccharin.

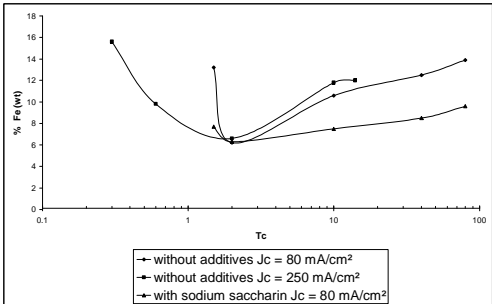


Fig 2. Fe composition in the CoFe alloy elaborated in various pulsed current conditions from electrolysis bath without additives and with sodium saccharin.

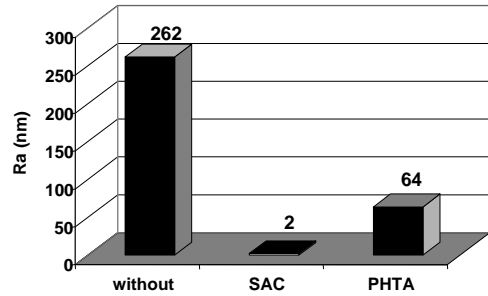


Fig. 3 Surface roughness of deposit elaborated without additives, with sodium saccharin and with phtalimide.