ON THE BEHAVIOR OF NICKEL THIN FILMS OBTAINED BY DIFFERENTS TECHNIQUES FOR THE PREVENTION OF CORROSION IN H_2S ELECTROLYTE.

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Abstract

The difference in the behaviour of nickel thin films obtained by two techniques (magnetron sputtering [1,2] and electrolysis) on steel AISI 1018 (UNS G 10180) at same thickness, with the purpose of comparing the deposition techniques was carried out [3]. Sour media was selected as electrolyte to obtain the effect in the corrosion rate of low carbon steel for an anticorrosive protection. For reference a massive nickel electrode was also evaluated. The evaluation was realized by using electrochemical techniques [4] (polarization curves and electrochemical impedance) in order to identify imperfections in the surface like porosities of the film and evaluate the protective properties in the aggressive media. SEM characterization was also performed in order to complement the information obtained. For simulating the aggressive sour media, the electrolytes that we proposed were NaCl 3%wt. + H_2S (saturated) and H_2O+H_2S (saturated).

An extra aim of this work is the study of the behaviour of a superior oxide nickel thin film over the nickel thin film exposed in the same media and compared the behaviour with the films without oxide.

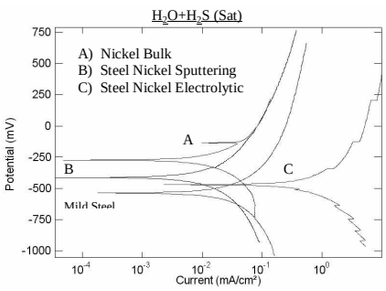

Figure 1, Polarization Curves with electrolytic and magnetron deposit of Nickel thin films exposed with H_2O+H_2S (Sat) electrolyte, using electrodes of Pt like reference.

Conclusions

The nickel coatings applied by sputtering present homogeneity in all the surface; on the contrary deposits obtained by electrolytic technique showed heterogeneities. These behaviours have been detected by polarization curves and impedance results, as well as SEM analysis.

References

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