SUMMARY

The corrosion problem is of a great problems, which faced the world from the last years until now, we can't hide this problem from our live but we can reduce "inhibit" it in the metals by several methods as the environment need. This work discuss the corrosion of Carbon Steel in 0.5M H_2SO_4,

This work contains three basic chapters

Chapter one " Introduction "

This chapter discussed:

1- Corrosion theory and corrosion protection

- Definition of corrosion
- Corrosion Prevention
- Classification of corrosion
- Electrochemical theory of corrosion

2- Carbon steel corrosion resistance

- Literature survey of corrosion of Carbon steel

Chapter two " Experimental techniques'

It includes the chemical composition of the investigated material, preparation of the used Sulfuric acid solution, the used Hydrazone derivatives, solutions and procedures used for the corrosion measurements such as weight loss and polarization techniques.

Chapter three "Results and Discussion"

It deals with the results obtained and their discussion

- Evaluation of the inhibitor efficiency by weight loss method for all used compounds in 0.5M H_2SO_4 at 30 ± 1^0 C revealed that the inhibitor efficiency increases with increasing the concentration. From these studies the order of inhibition efficiency of compounds 1-4 in 0.5M H_2SO_4 is found to be :

$$1 > 2 > 3 > 4$$

- These Hydrazone derivatives obey Frumkin's adsorption isotherm showing that the inhibition is by adsorption.

- Synergetic effect of Hydrazone derivatives and KBr, KSCN and KI on Carbon Steel corrosion inhibition in 0.5M H_2SO_4 was studied . The results indicate that the % inhibition increased in presence of $1x10^{-2}$ M of each of these anions. The adsorption ability on the Carbon Steel surface was in the order KI> KSCN> KBr.

- The effect of temperature on the corrosion inhibition of Carbon Steel in 0.5M H_2SO_4 was determined over the temperature range 303-323 K using weight loss measurements. The rate of corrosion increases with increasing the temperature together with decrease in inhibition efficiency indicating that the inhibition occurs through physical adsorption of the additives. Thermodynamic functions of activation were calculated .

- Study activation parameters of Hydrazone derivatives by Arrhenius plots of logarithm corrosion rate (log k) against reciprocal of absolute temperature (1/T) were found to be linear and obeyed the following equation:

$$\log k = \log A - Ea^*/2.303RT$$

  Also ,thermodynamic parameters (ΔH^* and ΔS^*) are computed and discussed.

- The effect of Hydrazone derivatives on the cathodic and anodic polarization of Carbon Steel in 0.5M H_2SO_4 was investigated. Corrosion rate decreased with increasing of concentration of the Hydrazone derivatives together with increase in both cathodic and anodic polarization, but the corrosion inhibition has a great effect on the cathodic polarization. Variation of inhibition efficiency with the structure of Hydrazone derivatives was interpreted in terms of the number of absorption sites in the molecule and molecular size, mode of adsorption and the polar effect of the substituent groups. The order of increased inhibition efficiency of Carbon Steel corrosion in 0.5M H_2SO_4 at all concentrations in the range $1x10^{-6}$ - $7x10^{-5}$ by polarization technique is :

$$1 > 2 > 3 > 4$$

- In conclusion, polarization and weight loss measurements support the assumption that corrosion inhibition primarily takes place through adsorption of the inhibitors on Carbon Steel surface. Agreement among these different independent techniques indicates the validity of the obtained results.

This thesis contains 126 references, 50 Figures, 19 Tables, Arabic and English summaries.