

- Document Type** : Thesis
- Document Title** : *Effect of some organic compounds on the inhibition of the acid corrosion of steel*  
تأثير بعض المركبات العضوية على تثبيط التآكل الحمضي للصلاب
- Document Language** : Arabic
- Abstract** : The effect of 2-mercaptobenzimidazole "inh.(I) " and 2-mercapto -5-methylbenzimidazole "inh.(II) " on the corrosion of mild steel in 1M solutions of sulphuric acid has been investigated in relation to the concentration of the inhibitor as well as temperature by various monitoring corrosion techniques. Results obtained revealed that these compounds are good inhibitors. All the impedance diagrams gave semicircles for both inhibitors indicating that the corrosion of mild steel is controlled by a charge transfer process and the presence of either inhibitor does not alter the mechanism of the dissolution of mild steel. In general, both inhibitors efficiencies increased with increasing the inhibitors concentration at all temperatures used. On the other hand, inhibitors efficiencies were almost constant with increasing the temperature at concentrations  $5 \times 10^{-4}$  M,  $1 \times 10^{-3}$  M and  $5 \times 10^{-3}$  M. The best performance was noticed in case of "inh.(II) "especially at the concentration  $5 \times 10^{-3}$  M. Adsorption of both inhibitors was found to follow Langmuir, Flory-Huggins isotherms and kinetic-thermodynamic model. The binding constants 'K' were calculated for both inhibitors. On increasing the temperature, the value of 'K' increased in both cases indicative of stronger binding of the inhibitor molecule to the mild steel surface and hence higher inhibition efficiency at higher temperatures. The activation energy of the corrosion reaction decreases with increasing the concentration of "inh.(I) "or "inh.(II) ". The adsorption of both inhibitors on the surface of mild steel is probably chemisorbed on the electrode surface. Mass loss measurements revealed that both inhibitors exhibit maximum inhibition efficiency with increasing the concentration and temperature. DC polarization data reveals that, both inhibitors does not alter the mechanism of anodic behaviour of mild steel and they behave as mixed type inhibitors. The data obtained from mass loss and DC polarization give the same trend obtained from AC impedance.
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