

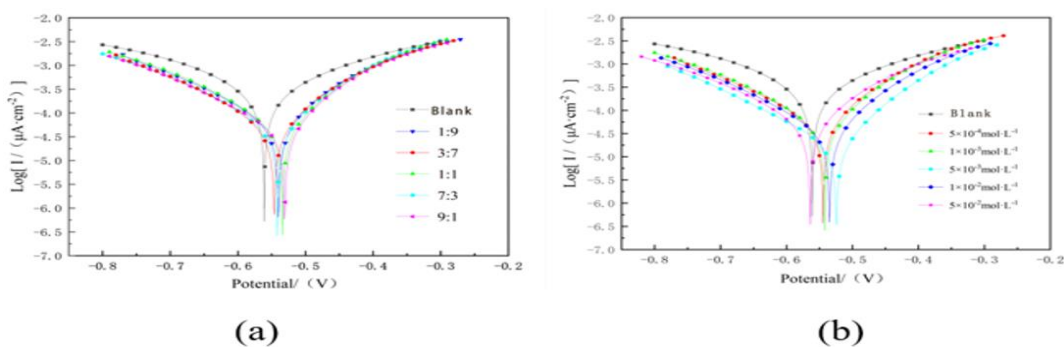
Corrosion inhibition of mild steel by a thiourea compound inhibitor

Xu Wang Honghong Zhang Zhongnian Yang

College of Chemical Engineering and Safety, Shandong University of Aeronautics, Binzhou, Shandong 256600, China

E-mail: XuWang202299@163.com

For mild steel corrosion in industrial production, the rust on the surface of mild steel can be effectively removed by pickling. However, mild steel is often corroded by the pickling agents during the pickling process. The use of corrosion inhibitors can effectively prevent excessive corrosion in the pickling process of mild steel. The corrosion inhibition performance of a mixed system of 2-amino-5-mercapto-1,3,4-thiadiazole (AMTA) and aminothiourea (ATU) for Q235 steel was investigated in 0.5 mol/L citric acid solution in this work. The results showed that the inhibition efficiency (IE) was significantly increased in the presence of these two compounds. The IE peaked and the synergistic corrosion inhibition effect became more obvious when the compounding ratio was ATU:AMTA=7:3 and the concentration was 1×10^{-2} mol/L. Furthermore, the result of electrochemical experiment were consistent with that of weight loss measurements. For citric acid solutions with a compound inhibitor of



constant concentration and volume ratio, the corrosion inhibition efficiency demonstrated a decline with an increase in temperature.

Figure.1 (a) Potentiodynamic polarization curve of MS in citric acid medium with different volume ratios of composite corrosion inhibitors of equal concentration; (b) Potentiodynamic polarization curve of MS in citric acid medium with mixed corrosion inhibitors of equal proportions and concentrations

Keywords: Aminothiourea, Thiazole derivatives, Synergistic corrosion inhibition effect, Mild steel

References

[1] Fan, W., Wang, H., Wang, C., Liu, Z., Li, K., & Zhu, Y. (2020). A sustainable dynamic redox reaction passive film for long-term anti-corrosion of carbon steel surface. *Journal of Colloid and Interface Science*, 580, 146-159.

[2] Tang, Z. (2019). A review of corrosion inhibitors for rust preventative fluids. *Current Opinion in Solid State and Materials Science*, 23(4), 100759.