

Experimental and Theoretical Investigation of Thiazolyl Blue as a Corrosion Inhibitor for Copper in Neutral Sodium Chloride Solution

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Durability test

For all electrochemical tests, immersing and testing are conducted in 3% NaCl solution with and without MTT. The OCP potential reaches a steady state for 1800s, suggesting the protective film can be formed in a short time. Furthermore, the durability measurement was performed to explore the durability of the Cu-MTT film. Figure S shows the impedance diagram for copper electrode in 5 mM MTT solution with different immersion time at 298 K. The inhibition effect increases when the immersion time is less than 3 h (95.7% for 0.5 h, 96.4% for 1 h, 96.8% for 2 h, 97.1% for 3 h), which is due to the rearrangement of adsorbed layer. The efficiency decreases slightly when the immersion time is more than 3 hours (97.1% for 4 h, 97.05% for 5 h, 91.8% for 10 h), which is owing to the desorption of film and unsound film. It can be seen that the film is stable in a short period of time (<5 h). However, when the immersion time is more than 10 h, the protective effect of the film becomes worse. This is due to corrosive substances in the solution such as Cl⁻ or unsound film.

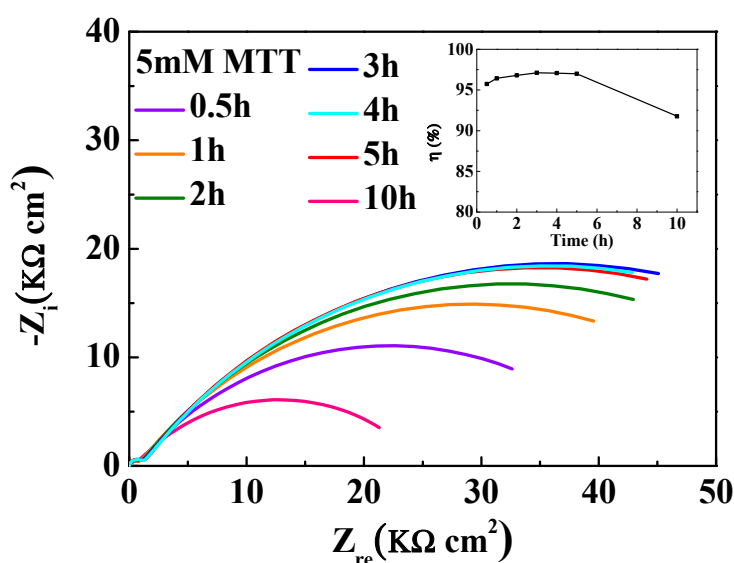


Figure S. The impedance diagram for copper electrode in 5 mM MTT solution with different immersion time at 298 K.