

PENGARUH KONSENTRASI EKSTRAK DAUN JERUK (CITRUS HYSTRIX) TERHADAP EFISIENSI INHIBISI KOROSI BAJA ST-37 MELALUI METODE ELEKTRODEPOSISI

ABSTRAK

Korosi merupakan salah satu penyebab utama kerusakan logam, khususnya baja, sehingga diperlukan upaya untuk menghambat laju korosi. Salah satu metode ramah lingkungan yang dapat digunakan adalah pemanfaatan ekstrak daun jeruk sebagai inhibitor dengan metode elektrodeposisi. Pada penelitian ini, sampel baja dielektrodeposisi dalam larutan elektrolit dengan variasi konsentrasi inhibitor 1%, 2%, 3%, 4%, dan 5% yang masing-masing diperoleh dengan menambahkan 1 mL, 2 mL, 3 mL, 4 mL, dan 5 mL ekstrak daun jeruk ke dalam 100 mL larutan elektrolit. serta waktu deposisi masing-masing 10 menit, 20 menit, dan 30 menit. Selanjutnya, sampel direndam dalam media korosif berupa larutan HCl selama 10 jam. Hasil pengamatan mikroskop optik memperlihatkan bahwa semakin lama waktu elektrodeposisi, kondisi permukaan baja semakin baik. Sementara itu, analisis XRD menunjukkan adanya tiga puncak difraksi tajam yang mengindikasikan pembentukan struktur kristal tembaga setelah proses elektrodeposisi, serta terbentuknya kristal tembaga dan oksida tembaga setelah perendaman dalam media korosif. Pengujian laju korosi menggunakan metode kehilangan massa menunjukkan bahwa baja yang dielektrodeposisi dengan konsentrasi inhibitor optimum menghasilkan laju korosi terendah sebesar 2,452 mpy dengan efisiensi inhibisi mencapai 84%. Hasil ini menunjukkan bahwa semakin lama proses elektrodeposisi dengan penambahan inhibitor yang tepat, maka semakin efektif senyawa aktif seperti tanin, alkaloid, dan flavonoid dalam melekat serta bereaksi membentuk lapisan pelindung pada permukaan baja. Senyawa aktif tersebut terdeposisi bersama ion tembaga sulfat dan membentuk kompleks yang berperan sebagai penghalang terhadap serangan korosif.

Kata kunci: Daun jeruk, inhibitor, lapisan Cu, Elektrodeposisi

THE EFFECT OF ORANGE LEAF EXTRACT CONCENTRATION (CITRUS HYSTRIX) ON THE EFFICIENCY OF CORROSION INHIBITION OF ST-37 STEEL THROUGH THE ELECTRODEPOSIT METHOD

ABSTRACT

Corrosion is one of the main causes of metal damage, especially steel, so efforts are needed to inhibit the rate of corrosion. One environmentally friendly method that can be used is the use of citrus leaf extract as an inhibitor with the electrodeposition method. In this study, steel samples were electrodeposited in electrolyte solutions with varying inhibitor concentrations of 1%, 2%, 3%, 4%, and 5%, which were obtained by adding 1 mL, 2 mL, 3 mL, 4 mL, and 5 mL of citrus leaf extract to 100 mL of electrolyte solution, respectively. and deposition times of 10 minutes, 20 minutes, and 30 minutes, respectively. Next, the samples were immersed in a corrosive medium in the form of HCl solution for 10 hours. The results of optical microscopy observations showed that the longer the electrodeposition time, the better the condition of the steel surface. Meanwhile, XRD analysis showed the presence of three sharp diffraction peaks indicating the formation of a copper crystal structure after the electrodeposition process, as well as the formation of copper crystals and copper oxide after immersion in the medium. Corrosive. Corrosion rate testing using the mass loss method showed that steel electrodeposited with the optimum inhibitor concentration produced the lowest corrosion rate of 2,452 mpy with an inhibition efficiency of 84%. These results indicate that the longer the electrodeposition process with the addition of the appropriate inhibitor, the more effective the active compounds such as tannins, alkaloids, and flavonoids are in adhering and reacting to form a protective layer on the steel surface. These active compounds are deposited with copper sulfate ions and form a complex that acts as a barrier against corrosive attacks.

Keywords: Lime leaf, inhibitor, Cu layer, Electrodeposition