Abstract

In this study, various aryldiazonium salts were electrografted on a copper substrate. Based on the structure and the wettability of the functionalized surface two proper aryldiazonium salt [p?phenylenebis(diazonium) salt (p-PBDS) and ٤-dodecylbenzendiazonium salt] was chosen to achieve two aims. The first is, the modification of the copper surface in order to attachment of graphene oxide, And the second, fabricating a highly hydrophobic surface with enhanced corrosion performance. the protocol of the first aim consisted of covalently modifying Cu in an electrografting process using the p?phenylenebis(diazonium) salt (p-PBDS) followed by immersion in a basic GO suspension. As a result, the presence of the p-PBDS interlayer facilitated the assembling of GO in a multilayered film. Potentiodynamic polarization results demonstrated that the coupling of GO with p-PBDS interlayer decreased current density by a factor of ~٥ and intensively prolongs the diffusion pathways for an aggressive solution toward the substrate. The protocol of the second aim consisted of the fabrication of a highly hydrophobic nickel film with a micro-nano structure using the electrodeposition process followed by the modification with ٤-dodecylbenzendiazonium salt. The wettability of the micro-nano nickel film was increased from ٧٠° for as-prepared nickel coating to ١٤٠° after modification with ٤-dodecylbenzendiazonium salt and it was unchanged by storing ٧ days in the air. The highly hydrophobic coating significantly decreased the corrosion currents densities (i_{corr}), indicating an improvement in corrosion performance.

Keywords: aryldiazonium salt, highly hydrophobic surface, interlayer, contact angle, graphene oxide