Corrosion Inhibition Effect of Histidine and Its Derivatives Self-Assembled Films Formed of 304 Stainless Steel

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The histidine and its derivatives self-assembled (SA) films were prepared on the 304 stainless steel (SS) surface. EIS and potentiodynamic polarization curves measurements proved that these SA films could effectively protect SS against corrosion in 3.5% NaCl solution, with a maximal protection efficiency of 94.24% achieved by Carbobenzyloxy-L-histidine film. XPS studies confirmed that Carbobenzyloxy-L-histidine molecule could adsorb on SS surface. The quantum chemical calculation and dynamic simulation provided the theoretical support about the inhibition mechanism.

Keywords: histidine; self-assembled films; 304 stainless steel; electrochemical techniques; XPS.

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