Use of EIS, Polarization and Electrochemical Noise Measurements to Monitor the Copper Corrosion in chloride media at different temperatures

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Different electrochemical methods were applied to monitor the copper corrosion behavior in 0.06 mol/L NaCl solution. Some important electrochemical parameters, including the polarization resistance R_p and charge transfer resistance R_{ct} were derived from linear polarization and electrochemical impedance spectroscopy, respectively. The results indicated that the calculated noise resistance R_n , which was obtained from moving average removal (MAR) or polynomial trend removal (PTR) trend removal method, could not equate with R_p or R_{ct} in the present study. However, the active pitting energy E_c , deduced from FWT method without trend removal technique, shows the similar variation trend with R_p or R_{ct} . Hence, electrochemical noise can be utilized as a nondestructive technique to on-line monitor the corrosion progress which can be performed with simple equipment. Furthermore, the deduced parameter E_c presents closer relation to the metal surface structure and shows the same variation trend with the corrosion rate and severity.

Keywords: copper; electrochemical noise; trend removal

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