Short Communication

Inhibitive Effect of N,N-Dimethyl Ethanolamine on Carbon Steel Bar in Chloride Contained Cement Extract

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doi: 10.20964/2017.01.31

Received: 14 October 2016 / Accepted: 8 November 2016 / Published: 12 December 2016

For studying the inhibitive effect of N,N-Dimethylethanolamine (DMEA) on carbon steel bar in cement extract, the corrosion behavior of steel bar in solution contained with 0%, 0.5%, 1.0% and 2.0% (wt.%) DMEA was investigated by open circuit potential (OCP), linear polarization (LPR), potentiodynamic polarization, and AC impedance spectroscopy (EIS), respectively. The values of OCP for samples were significantly decreased after 336 h immersed in the cement extract without DMEA; while these of the samples in solutions contained DMEA were only slightly changed during the whole immersion process. The potentiodynamic polarization results suggest the DMEA is a cathodic inhibitor in the chloride contaminated cement extract. Moreover, there is only slight corrosion inhibition effect in the solutions contained DMEA in the initial stage. After immersion for 336 h, the LPR and EIS results indicated that the polarization resistance and impedance obviously increased with the concentration of DMEA. The inhibition effect of DMEA on carbon steel increased with the concentrations. Simultaneously, the further analysis of EIS results suggests that the DMEA forms an absorption layer on the surface of rebar and inhibit the the corrosion of carbon steel.

Keywords: N,N-Dimethylethanolamine; Corrosion inhibition; OCP; Linear polarization; EIS

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