Corrosion Protection of Carbon Steel by Zn/PPY Coating as Layers in 3.5% NaCl

Abstract - Plate from low carbon steel was took from oil pipelines, and coated with two layers, the first layer was done by sherardizing process at 400°C for variable periods (15, 30, 60, 120, 240) min, the second layer was applied by polypyrrole (PPY). The results showed that the thickness of sherardizing layer paint is increased when increasing treatment time (15, 30, 60, 120, 240 min). The corrosion performance was evaluated by using polarization method. In addition, it was examined morphological surface of paint layers by using scanning electron microscope (SEM). The results showed that the presence of polypyrrole layer with sherardized coatings, showned significantly increase in corrosion resistance, and coating of low carbon steel by using polypyrrole the conductive polymer with sherardizing process, drastically reduced from the corrosion current density values, as well as the corrosion rate of low carbon steel. The corrosion rate of the polymer conductive coatings (PPY) on low carbon steel without sherardizing coating (as received) is 19.5 mpy while incorporation of PPY and sherardizing gives corrosion rate of 0.00371 mpy.

Keywords: Polypyrrole; sherardizing; Low carbon steel; Electrochemical polymerization; Corrosion rate.