Short Communication

Electrochemical Corrosion Behavior of TiN-coated 310S Stainless Steel in an Electric Water Heater in a Simulated Environment

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A uniform and dense TiN coating was successfully prepared on the 310S stainless steel by magnetron sputtering. The morphologies and chemical composition of the TiN coating were analyzed by using scanning electron microscopy (SEM) and X-ray diffraction (XRD). The electrochemical corrosion behavior was investigated in a simulated electric water heater environment. The results reveal that the TiN coating exhibits good stability in synthetic tap water and 3.5% NaCl solution at 80 °C. The values of polarization resistance, corrosion potential and pitting potential of TiN-coated 310S stainless steel are much higher than those of the 310S substrate. It is suggested that TiN coatings can provide excellent corrosion resistance for 310S stainless steel in an aggressive environment containing chloride ions.

Keywords: 310S stainless steel; TiN coating; Electrochemical corrosion; Tap water

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