

## **Surface morphology and corrosion behavior of electrolytic coatings in different aqueous solutions**

### **Abstract**

ZrO<sub>3</sub>/Al<sub>2</sub>O<sub>3</sub>, Al<sub>2</sub>O<sub>3</sub>/Y<sub>2</sub>O<sub>3</sub>, ZrO<sub>2</sub>/Y<sub>2</sub>O<sub>3</sub> coatings were applied on SS440C steel substrates via an electrolytic double layer coating process. The effect of these different ceramic aqueous solutions on the surface morphology and corrosion protection of the coatings were studied. It was seen that ZrO<sub>2</sub>/Y<sub>2</sub>O<sub>3</sub> coating layer is adherent and subsequently facilitates significant protection against corrosion as tested by Tafel Extrapolation test in form of potentiodynamic polarization. The surface morphology and hardness properties were examined by scanning electron microscopy (SEM) and Vickers hardness tester respectively. ZrO<sub>2</sub>/Y<sub>2</sub>O<sub>3</sub> double layer coating shows the best properties in morphology and hardness as compared to other aqueous solutions.

**Keywords;** Electrolytic Coating, SS440C Stainless Steel, Tafel Extrapolation Method