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ANTI-CORROSION COATING OF MILD STEEL USING TERNARY Zn-ZnO-Y_2O_3 ELECTRO-DEPOSITON

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ABSTRACT

Mild steel has found many engineering applications due to its great formability, availability, low cost and good mechanical properties among others. However its functionality and durability is subject of concern due to corrosion deterioration. Based on these, Yttria is selected as reinforcing particles using electroplating process to enhance the corrosion and wear behaviors. Bath formulation of Zinc- Yttria was prepared at moderated temperature and pH, to coat the sample. Corrosion and wear behaviour were analyzed using electrochemical potentiostat and abrasive test rig. The composition and microstructure of coated samples were investigated using standard method. The microstructure of the deposited sample obtained at 10 % Yttria, revealed fine-grains deposit of the Yttria on the mild steel surface. The results showed that adding of Yttria particles, improved wear behaviour and corrosion resistance in sodium chloride solution. Microhardness of the coated samples showed increases hardness values before and after heat treatment. This work established that elecrodeposition of mild steel with Yttria is promising in increasing the wear and corrosion resistance.

Keywords: Microhardness, Zinc-Yttria, Coating, Mild steel, Microstructure, Wear and corrosion.