

## Abstract

Nano-sized particle incorporation into metal matrix has gained worldwide acceptance.  $\text{Al}_2\text{O}_3$ ,  $\text{Cr}_2\text{O}_3$ , and  $\text{SiO}_2$  nanoparticles have been co-deposited with Zn using electrodeposition process to produce advanced alloy. The coatings were characterized using SEM/EDX and XRD. The mechanical properties of the coatings were studied using microhardness indenter and dry abrasive wear tester. Zn-10 g/L  $\text{Cr}_2\text{O}_3$  nanocomposite exhibited the highest microhardness of 228 HVN; Zn-5 g/L  $\text{Al}_2\text{O}_3$  nanocomposite possessed the highest corrosion resistance and lowest wear loss. Zn-5 g/L  $\text{SiO}_2$  nanocomposite showed good stability against other composite coatings. The incorporation of the  $\text{Al}_2\text{O}_3$ ,  $\text{Cr}_2\text{O}_3$ , and  $\text{SiO}_2$  shows grain refinement and modify orientation on Zn matrix.