

**A Dissertation Report
on
Galvanostatic Deposition of Zinc Phosphate Coating on Low Carbon Steel
using Nano Zinc Oxide and Electrochemical Studies**

Submitted in partial fulfilment of the requirements

of the degree of

**Master of Technology
(PROCESS METALLURGY)**

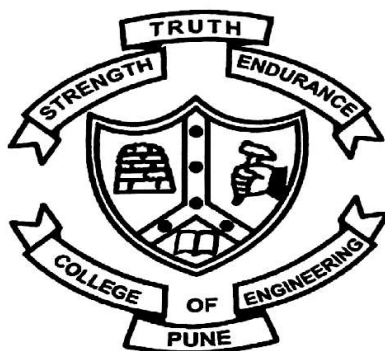
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ABSTRACT

Zinc phosphate coating was developed by galvanostatic method and have been optimized in terms of corrosion resistance. Nano Zinc oxide particles were incorporated into optimized zinc phosphate coating. The crystal structure and chemical composition of coating was studied by scanning electron microscopy and energy dispersive spectroscopy respectively. Corrosion protection performance of the coated low-carbon steel samples in 3.5 wt % sodium chloride solution was evaluated using electrochemical technique. The corrosion rate of Nano ZnO incorporated zinc phosphate coating on low carbon steel was found to be 1.89 mpy which is about 5 times lower than that of uncoated low-carbon steel and 1.2 times lower than that of normal ZnO incorporated zinc phosphate coating. The study reveals the possibility of using Nano ZnO for corrosion protection.

Keywords: Galvanostatic deposition, Nano ZnO, phosphate coating, potentiodynamic polarisation study, electrochemical impedance spectroscopy, corrosion rate.