

## **INVESTIGATION ON THE IMPROVEMENT OF WEAR AND CORROSION RESISTANCE USING THIN FILM COATINGS ON THE ALLOY MATERIALS FOR AUTOMOBILE APPLICATIONS**

### **ABSTRACT**

Friction and wear of the sliding components in an automobile cause an increase in both fuel consumption and emission. Many engine components involved with sliding contact are all susceptible to scuffing failure at some point during their operating period. Therefore, it is important to evaluate the effects of various surface coatings on the tribological characteristics of the automobile parts most coatings have high temperature and good impact strength, excellent abrasion resistance and are so durable. In addition PVD coatings are more environmental friendly than traditional coating methods like electroplating and painting.

Heat treatment is one of the essential processes in obtaining desirable characteristics of metal. Annealing is one such important heat treatment method which decreases the chance of formation of cracks during cold working, since, the mechanical stresses of the material are released during annealing. Transition metal nitrides have been extensively used in industry as protective hard coatings because of their hardness and wear resistance.

In this research three coating types were carried out, Namely TiN, DLC and PSZ. TiN was coated on SS 304L and Al1100 it was found that corrosion and wear resistance increased by a significant amount. Also DLC coatings shows better corrosion and wear resistance compare with TiN coating. PSZ coating also better corrosion and wear resistance increased better then TiN and DLC. This is due to the uniform coating of PSZ, chemical inertness, higher hardness and very high chemical stability in the chloride environment.