

BACHELOR'S THESIS

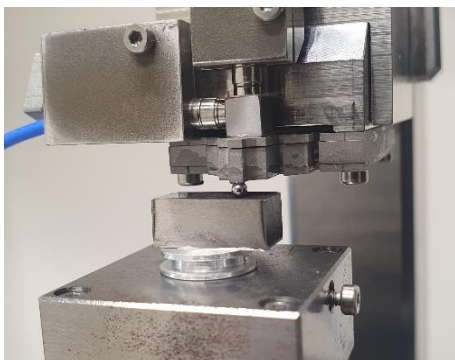
Investigation of the tribological behavior of a graphite phenolic resin solid lubricant coating:

Background

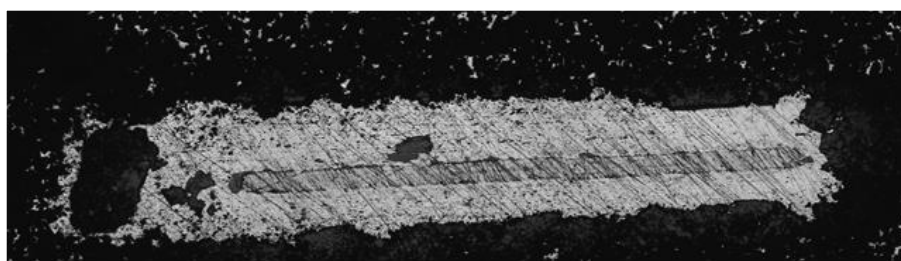
Most mechanical systems subdue friction and wear during their service life leading, in most cases, to larger energy consumption. Higher friction could lead to severe wear; thus, lubricants are used. Conventional liquid lubricants fail under high temperatures and/or higher loads; in these conditions, solid lubricants are often preferred due to their ability to withstand extreme operating conditions. Numerous solid lubricants have gained significant attention throughout the years due to their outstanding properties namely graphite has been found to exhibit remarkable lubrication and anti-wear properties under high loads. The formation of transfer films on the contact surface is responsible for the reduced friction. Binders could be combined with graphite to increase the lifetime of such graphite lubricating coatings.

Objectives

The specific objective of this thesis is to study the friction and wear behavior of a lubricating graphite phenolic resin blend coating, as well as the transfer film formation mechanism when such coatings are used. The retained candidate will prepare coated samples with different thicknesses, determine the frictional behavior on a constructed equipment to carry out the necessary experiments. As part of the project, the wear tracks are to be thoroughly characterized using a confocal microscope (potentially scanning electron microscope) and analyzed in conjunction with the measured friction.



Load adjustable friction tester



Confocal images of the wear tracks after friction test showing the lubricating transfer film formation.

Requirements

Student in the fields of physics, mechanical engineering, materials science or chemistry. Previous knowledge in the field of tribology is not necessary. Demonstrating a large scientific curiosity, as well as interest in hands-on lab work. Knowledge about surface characterization is advantage but can be acquired during the course of this project and additionally Python skills is an asset.

Possible start: as soon as possible

Contact

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