

Addition of Solid Lubricants to Metal Matrices and Liquid Lubricants to Improve Tribological Performance

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Abstract

Solid lubricants play an important role in tribology for minimizing friction and reducing wear. Solid lubricants have been used in automotive and aerospace industries over fifty years for lubrication purposes, recently, they are incorporated as reinforcement in metal matrix composites to design self-lubricating composite materials and also as an additive in lubricants to further improve the lubrication performance. The use of self-lubricating composite components in automotive and industrial applications is very crucial in order to avoid the use of petroleum based lubricants which are toxic to the environment. Also, solid lubricants are used in natural oil in order to improve the lubrication performance of natural oils as it was found that they are feasible and economical alternatives to petroleum based lubricants. Further, green solid lubricants are gaining attention in academic and industrial sectors due to environmental concerns. In this paper, we present the role of solid lubricants as reinforcement in the metal matrix material and also as additives in natural oils to improve the tribological performance. More specifically, solid lubricants ranging from micron to nano size and their combinations are incorporated to study the tribological performance. The influence of size effect in the composite and oils on the tribological performance will be addressed in this research.