

NT29

Tribological Performance of Graphene and Graphene Oxide Films as Solid Lubricant Layers on Tool Steel Surfaces

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Abstract. Some high productive processes induce a use of effective cooling and lubricating of forming and cutting tools today. Apart of various fluids, foams, oils and emulsions with EP (extreme pressures) additives some very effective means based on graphene or graphene oxide show excellent performance in solid phase. In this study, a very effective way to enhance the tribological performance of graphene layers on tool steel surfaces is studied. The solid lubricants based on graphene and graphene oxide flakes showed a very good thermal stability, low coefficient of friction; high wear resistance, and controllable thickness, if required. However, some technological conditions and topographies of surfaces for their successful applications should be made in advance as prerequisites. The research work deals with optimization of the parameters for a high productive forming of metals.

The full paper is published in IOP Conf. Series: Materials Science and Engineering, Volume 968:

<https://iopscience.iop.org/article/10.1088/1757-899X/968/1/012028/pdf>