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Abstract

Micro parts have become inevitable nowadays for a large number of applications in the areas such as space technology, medical science, nano technology, and electronics. This creates a significant need to develop new techniques, and machine tools for micro manufacturing. In the micromanufacturing process, the interfacial friction between the forming tool and the workpiece is uncertain. It has a significant impact on process workability, which is a key factor in material formability. In the current work microtribological behavior of hexagonal 2D-SnS₂ nanosheets as lubricating additives is investigated. Upon the usage of nanoadditive lubricant in the extrusion of micro stepped pin, the extrusion force reduced significantly. Due to the presence of nanoadditives an increased surface quality in the extrudates was observed and it was further justified in the surface roughness results. The raise in temperature leads to more uniform hardness, with a significant reduction of coefficient of variation along with improved material formability. This research work provides a deeper understanding of the characteristics of nanoadditive lubricant and its tribological behavior in the microextrusion process.



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