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Authors: Bo Mao, Arpith Siddaiah, Pradeep L. Menezes, Yiliang Liao

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# Surface Texturing by Indirect Laser Shock Surface Patterning for Manipulated Friction Coefficient

Bo Mao[a], Arpith Siddaiah[a], Pradeep L. Menezes[a], *, Yiliang Liao[a], *

[a] *Department of Mechanical Engineering, University of Nevada, Reno, Reno, NV 89557 USA*

* Author to whom correspondence should be addressed. Electronic mail: yliao@unr.edu (Yiliang Liao), pmenezes@unr.edu (Pradeep L. Menezes)

## ABSTRACT

Various surface engineering techniques have been developed to improve the tribological performance at tribo-contacts. In particular, research efforts have been put on either enhancing the wear resistance through surface strengthening processes or manipulating the coefficient of friction (COF) through surface patterning processes. A new material process integrating both strengthening and patterning effects might lead to broader impacts in tribology research and applications. In this study, a novel laser-based surface processing technique, named indirect-laser shock surface patterning (indirect-LSSP), is developed. This process utilizes the laser-induced shockwave loadings to introduce the surface strengthening and patterning effects simultaneously, leading to the fabrication of anti-skew surfaces with arrays of micro-indentations for the enhanced wear resistance and manipulated friction values. Indirect-LSSP experiments were carried out on AISI 1045 steels. The 3D surface profiles after LSSP were characterized. The hardness of surface patterns prepared by laser processing was measured. The friction values