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PROCEEDINGS

Microstructural and Mechanical Characterization of Tribological Behavior of Copper Alloy C93900 Through Testing and Failure Analysis

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Copper and its alloys find wide application across various branches of engineering, including thermal, electroelectronics, and sugar-alcohol industries. With over 400 known alloys, those containing lead are particularly noteworthy for their use in sliding bearings. Lead is insoluble in solid bronze alloys, remaining isolated in the form of small nodules within the Cu-Sn-Zn ternary matrix. This study is based on an alloy similar to C93900, with approximate compositions of 75% Cu, 4% Sn, 8.5% Zn, and 12.5% Pb, where lead aids in reducing adhesion. The aim of this study is to analyze the microstructure and mechanical characterization, as well as investigate the tribological behavior of this alloy. Microstructure was analyzed using both Optical and Scanning Electron Microscopy, along with X-ray Diffraction. Brinell Hardness tests were conducted, resulting in an approximate hardness of 60.28 HB. Additionally, Pin-on-Disc tests were performed under dry and lubricated conditions to determine friction coefficient and wear rate, revealing minimal wear even under dry conditions.