

# Review of: "Investigating the Mechanical and Tribological Effects of MoS<sub>2</sub> Reinforcement in AZ91 Magnesium Alloy: A Comprehensive Experimental Study"

Andrew Gryguc<sup>1</sup>

<sup>1</sup> University of Waterloo

Potential competing interests: No potential competing interests to declare.

The study provides a comprehensive examination of the effects of MoS<sub>2</sub> reinforcement in the AZ91 magnesium alloy, highlighting significant microstructural refinement and improvements in mechanical properties. However, a more detailed analysis of the grain boundary characteristics and phase distribution within the stir zone would enhance the understanding of the strengthening mechanisms. Advanced characterization techniques such as Transmission Electron Microscopy (TEM) or Electron Backscatter Diffraction (EBSD) could provide deeper insights into the microstructural evolution and its correlation with the observed mechanical performance.

While the study demonstrates enhanced surface hardness and wear resistance due to MoS<sub>2</sub> reinforcement, it would benefit from a thorough investigation into the tribological performance under varying load and speed conditions. Incorporating wear rate measurements and examining the wear mechanisms through Scanning Electron Microscopy (SEM) analysis of the worn surfaces would provide valuable information on the durability and potential applications of the composite. Additionally, comparing the wear behavior with that of other common reinforcements, such as SiC or Al<sub>2</sub>O<sub>3</sub>, could position the MoS<sub>2</sub>-reinforced AZ91 alloy within the broader context of magnesium-based composites for practical applications.