

Review of: "Investigating the Mechanical and Tribological Effects of MoS₂ Reinforcement in AZ91 Magnesium Alloy: A Comprehensive Experimental Study"

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Potential competing interests: No potential competing interests to declare.

Overall, this work is good. It shows the advantages of MoS₂ reinforcement in AZ91 Mg alloy to enhance its mechanical properties. However, there are a few points that need to be addressed in this work, which is vital to be implemented by the authors to increase the quality and novelty of this work.

1. Authors mentioned that they have identified the optimal processing conditions: rotation speed of 1100 rpm, travel speed of 15 mm/min, load of 10 kN, and tool material tungsten carbide. How was this justified in this paper? Seems like the brief explanation regarding this optimal condition does not brief well and is misleading. It is suggested that they use the Taguchi method, 2k factorial, RSM, or multi-criteria decision-making method (MCDM) in order to justify this optimal condition.
2. In addition, when we talk about the optimal condition, it should be involved with the significant parameters of the condition. In this case, only a few have been addressed by the authors.
3. The setup of FSP is not shown well and briefly explained in Figure 1 and Table 2. The quality of the photo is dull, and lighting affects the ambient colour of the photo. There should be a clearly labeled picture and good information in the photo explaining the parts, etc.
4. The specimen hardness photo in Figure 2 is not taken in a good way. There should be an indicator to justify the size and dimension of the samples. And it should be taken in the same position.
5. Why is there a compulsion to take the recorded readings of tests using 3 rotational speed conditions? No justification in this paper. If it is for the justification of optimal conditions, these parameters need to be enhanced in a proper way, as mentioned in point no. 1.
6. Despite hardness and tensile testing, this experiment should include some tests like impact tests or bending tests. Or at least, be justified with computational methods and/or statistical methods.

Overall, it is suggested that the authors revise the manuscript before the manuscript is accepted in the particular journal.