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Effect of Zirconium Addition to Aluminum Grain Refined by Ti on its Resistance to Wear: A Three-Dimensional Approach

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Abstract : Aluminum and its alloys are versatile materials which are widely used in industrial and engineering applications due to their good and useful properties e.g. high strength to weight ratio, high thermal and electrical conductivities and good resistance to corrosion. However, against these favorable properties they have the disadvantage they solidifying large grain columnar structure which negatively affects their mechanical properties and surface quality. Aluminum alloys are normally grain refined by some alloying elements, such as Ti, Ti-B or Zr. In this paper, the effect of zirconium addition to Al grain refined by Ti after extrusion on its wear resistance is investigated under different loads and sliding speeds namely at 5,10 and 20 N loads and sliding speeds ranging from m/min. and m/min. the results are presented in three-dimensional wear mode. To the best the authors' knowledge, the wear of aluminum in 3-dimensions has never been tackled before. In this work, the wear resistance of by presenting the results of wear are presented and discussed on the time, load and speed plots.

Keywords : aluminum grain refined, addition of titanium, wear resistance, titanium
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