

Investigations on mechanical wear and machining characteristics of tungsten disulfide ws2 particles reinforced bronze matrix composites

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Abstract:

In this present work, an attempt is made to investigate the effect of tungsten disulfide (WS₂) particles addition on mechanical, wear and machining characteristics of phosphor bronze. The composites are fabricated by stir casting technique with 4 %, 6 % and 8 % of WS₂ particles. To confirm the uniform distribution of reinforcement phase, the microstructures of composites are analyzed by Scanning Electron Microscope (SEM). The presence of WS₂ particles and other ingredients in the composites are ensured by X-Ray Diffraction analysis.

The mechanical properties such as hardness and flexural strength of composites are examined by Brinell hardness test and 3 point bending test respectively as per ASTM standard. The tribological characteristics of composites are examined by pin on disc test rig. The wear rate and frictional coefficient are evaluated as a function of applied load, sliding velocity, sliding distance and percentage of WS₂ reinforcements. The wear surface morphology and wear mechanisms obtained on composite pins are analyzed by SEM and it is correlated with wear test results.

Finally the study outlines that WS₂ reinforced phosphor bronze self lubricating composites can be replaced for conventional worm wheel applications owing to better wear resistance and improved mechanical properties.