

## Wear properties of metal matrix composites Al-Cu and Al-Cu-TiB<sub>2</sub>

### ABSTRACT

Tensile and wear properties of aluminium (Al) based metal matrix composites (MMCs) was prepared by added titanium diboride (TiB<sub>2</sub>) with in-situ technique by salt route. The salts used in this research were potassium hexafluorotitanate (K<sub>2</sub>TiF<sub>6</sub>) and potassium tetrafluoroborate (KBF<sub>4</sub>). Nanocomposite samples were prepared by casting technique associated with incorporating 3 and 6 wt.% of TiB<sub>2</sub> into matrix of Al-6wt.%Cu. Instron and wear tests machine were used to characterize the tensile and wear Al-Cu alloys properties. Results showed that increase in TiB<sub>2</sub> content gave the high properties of tensile and wear behavior. The study indicates that TiB<sub>2</sub> particles have giving improvement the wear performance of the Al-6wt.%Cu alloy. For a constant load and sliding speed, the wear rate decreases as a function of amount of TiB<sub>2</sub> in the composite. The wear rate decrease with increasing in wt.% TiB<sub>2</sub> particles for the all loads applied. However, addition of TiB<sub>2</sub> particle to the Al-6 wt%. Cu matrix has show the coefficient value of wear decreases regardless of applied load. Study of the wear surfaces both alloy and composites by optical microscope suggests that the improvement in wear resistance is mainly due to the formation of finer groove or debris by content of TiB<sub>2</sub>.

**Keyword:** Wear properties; Metal matrix composite; Composite Al-Cu; Titanium diboride (TiB<sub>2</sub>); Salts route