

## Studies on Wear Characteristics of Al-Si In-Situ Composites

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### ABSTRACT

Aluminum matrix composites (AMCS) have become one of the potential engineering materials for automotive, aerospace, defense and general engineering applications, where light weight, high specific strength and modulus, temperature resistance, low coefficient of thermal expansion (CTE) and improved tribological properties are required. Generally, the addition of insitu composites to the base matrix enhances their wear resistance. This increase in wear resistance is mainly depends on the type, size, shape and distribution. The present paper deals with the wear behavior of unmodified and modified Al –Si in-situ composites (0-20 wt % Si) studied through tribometer under different normal pressures, sliding distance s and sliding speeds. The modification treatment causes the disappearance of primary silicon crystals with the formation of solid solution dendrites ( $\alpha$  Al) and extremely fines globular eutectic silicon instead of needle like structures. A considerable improvement in wear resistance and mechanical properties was associated with the resulting structural changes. Microstructures of different specimens have been compiled with their wear behavior. Whilst all the composites showed excellent wear resistance in modified condition compared to the unmodified condition. This is due to the modification with strontium (Sr), which imparts further enhanced resistance to wear, reduced coefficient of friction and improved mechanical properties. In the present work, an attempt has been made to correlate the wear results and mechanical properties with the microstructure of the Al-Si In-situ composites.

**Keywords:**  $\alpha$  –Al matrix, tribometer, modifiers and Al-Si In-situ composites