E1-:41 A study of erosive wear behaviour of sialons and some selected ceramics

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Ceramics are becoming leading candidate materials for most tribological applications because of their high hardness, strength and chemical inertness. Erosive wear, which is a severe life limiting factor, is to be considered seriously

before the applications. The objective of this study was to compare the erosion behaviour of various α-sialon ceramics which are new candidate materials for tribological applications, with some selected technologically important ceramics. Experiments were performed to compare the resistance to erosion under a fixed set of experimental conditions and also to study the dependence of erosion on particle size distribution and slurry loading.

Pressureless sintered Ca, Y, Yb, and Nd α-sialons and hot pressed Ca and Y α-sialons, β-sialons, Si_3N_4, SiC and CeO_2 stabilised ZrO_2 were used as sample materials. α-alumina was used as the controllers to ensure identical test conditions. For this study a simple slurry pot tester was constructed. SiC grits with 3 different sizes were used as erodent particles to prepare slurries in distilled water with different slurry loading as 15, 25 and 35%.

Erosion of the specimens was determined as a function of time by measuring the mass loss. Almost all α-sialons showed a superior erosion resistance and the others can be ranked in a descending order as β-sialons, SiC, Si_3N_4, α-alumina and CeO_2 stabilised ZrO_2 according to their resistance to erosion. In α-sialons, hot pressed materials showed better resistance than pressureless sintered materials and the materials with higher α content showed higher erosion resistance. The study also showed that the slurry variables such as particle size distribution and slurry loading play an important role in erosion.

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