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International Research Group on Wear of Engineering Materials



Micro-Tribology Experiments on WC/Co Hardmetals

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WC/Co hardmetals are widely used in tool and wear applications, taking advantage of their unique combination of high strength and relatively high toughness. They are also two phase materials where the properties of the material can be varied over a very wide range.

This paper describes model single point abrasion experiments that were carried out with a simple micro tribology test system on a range of WC/Co hardmetals.

Test were carried out using diamond indenters moved over the test surface at loads from about 15mN up to 300 mN. Experiments were carried out in air and in acidic conditions to examine the synergistic effects of corrosion.

It was found that a number of different mechanisms occurred, including cumulative plastic deformation of the WC grains, deformation of the Co binder phase, and cracking and fragmentation of the WC grains.

The results of the experiments are compared with observations made in macroscopic abrasion experiments.