The advantages of MSE evaluation method

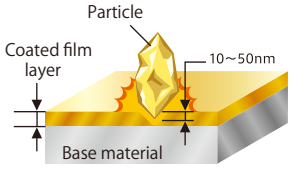
A Evaluation technique

Slurry (water and solid particle mixture) were mixed with compress air in the nozzle and eventually injected on material surface at high velocity. Injected slurry on material surface resulted, a wear progression (wear rate) proportionately to the erosion (a strain/ scar occurred at the surface by particle collusion) strength of the material. It is a new type of solid particle impact test (slurry jet) to swiftly evaluate wear properties of various material especially hard coated thin films.

B Advantages

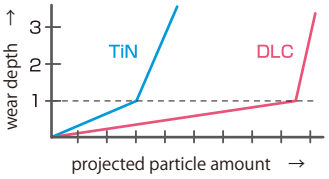
1 Quality evaluation of thin film

As the grinding depth of one solid particle is about 10-50 nm, damaged degree of depth on material surface is so low. As the result, it is possible to evaluate coated thin film layer without damaging its base material.



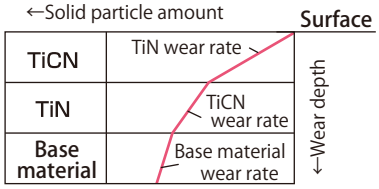
2 Hard coating material evaluation

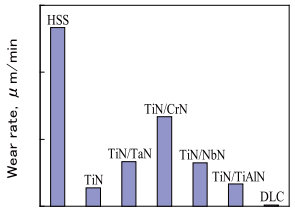
With the possibility of continuous impact of solid particle, long hour operation and the possibility to control amount of impacted solid particle (1,100,1000 g), the wear strength measurement of hard coated film such as DLC are possible.



3 Continuous measurement from material surface

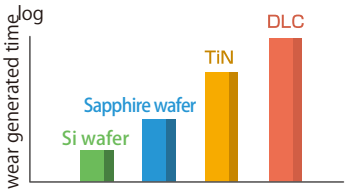
With the possibility of sequential measurement of wear depth by generated wear and amount of particle impacted on material surface, a continuous measurement of all layers which is up to 20 μm of wear depth are possible.





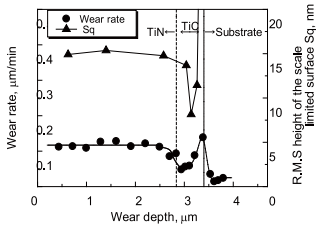
4 High resolution capability for hard material

With the same experimental condition using MSE tester, the wear progression degree on soft material surface is faster than on hard material surface. For example, wear rate on Si wafer surface is 5 μm/g while TiN is 0.05 μm and on DLC surface is 0.002 μm. In the other word, high resolution capability measurement (nanometer scale unit) of wear depth for hard material is possible.



5 Less time measurement

With the use of high velocity slurry injection, a faster result can be achieved. For example, to generate 1 μm of wear depth on Si wafer take about 3 sec, on sapphire surface is about 75 sec, TiN about 350 sec and on DLC it take about 8000 sec in time.



6 Final evaluation in manufacture process

MSE tester also can be use for smoother manufacturing process. With MSE tester, the practical evaluations for final test that include materials element, crystalline, and manufacture process are possible. By using wear rate, the comparative evaluation and quality determination can be conduct.

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