

Investigation of Toughness and Wear Resistance of a-C/a-C:Cr Multilayer Coatings

馬廣仁, H. H. Chien, C. L. Chao

Mechanical Engineering

Engineering

kjma@chu.edu.tw

Abstract

Alternated a-C/a-C:Cr coatings were made by DC magnetron sputtering from graphite and Cr target in an argon discharge. Mechanical and tribological properties were measured by indentation, scratch and pin-on-disc test. The critical scratch load of a-C/a-C:Cr multilayer coatings for total failure is approach 100 N. The friction coefficient remains within the range of 0.08-0.1 at loads between 10 and 40 N during a pin-on-disc wear test. The wear depth only reaches 0.6 μm after a one hour wear test. The greater compliance and fracture toughness of the a-C/a-C:Cr multilayer coatings allows greater strains or strain energy to be stored before coating failure, and hence significantly improves wear resistance

Keyword : Wear Resistance

Toughness

Multilayer Coatings