In Situ Real Time Observation of Tribological Behaviour of Coatings

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The functional performance of coatings can be transformed using coatings to form a surface system where resistance to wear and friction are improved relative to the uncoated substrate. Understanding the failure mechanisms of coatings in tribological contacts is difficult to achieve. This paper gives results from real time in situ measurements of tribological behaviour. Two different test systems have been used. These are an a microtribometer fitted inside an SEM which provides sequences of high resolution images of the deformation processes occurring in coatings, and a ball on disc tribometer fitted with imaging and profilometric systems giving realtime information on the tribological response of coatings.

DLC and TiN coatings on tool steel substrates were tested in the experiments reported here. Delamination failure of the DLC coatings was observed with both test system. A new rotating scratch test is also described that can provide real-time in situ information on the response of the coatings to repeated abrasion. The *in situ* results are supported by post-test surface examination.

Keywords: In situ testing, Coatings, Surface characterization, New test methods

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