

Hardness, wear and microstructure of carbon implanted AISI M2 high speed steel

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The hardness, wear behaviour and microstructure of AISI M2 high speed steel implanted with carbon ions are discussed. The samples were implanted at an energy of 100 keV. The doses ranged from 1×10^{17} C⁺/cm² to 3×10^{18} C⁺/cm². Hardness increases due to ion implantation, but no significant dose dependence is found. For lower doses the wear effects mainly the pin, but from doses of 5×10^{17} C⁺/cm² onwards a pronounced ploughing of the disk is observed. The abrasive wear rate decreases with increasing dose. Microstructural investigations reveal the presence of ϵ -carbide and graphitic carbon in the implanted volume. A possible correlation between hardness and wear is discussed based on the microstructural results.