Study of tribological properties of high-speed steel implanted by high-dose carbon ions

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The changes in tribological behaviour of high-speed steel (M2) samples implanted with carbon ions at high fluences (5×10^{17}~3×10^{18} cm^{-2}) have been studied. The ion energies used were 50 and 100 keV leading to a modified layer of 200 and 400 nm, respectively. Obviously, the samples show an improved tribological behaviour, although the microhardness of the surface decreased after implantation. Tribological measurements, microhardness measurements, RBS, SEM and EDX analyses were performed before and after ion implantation. The experimental results are discussed, and it is concluded that the improvement of wear behaviour can be correlated to an improved toughness of the near surface layer modified by the ion implantation.