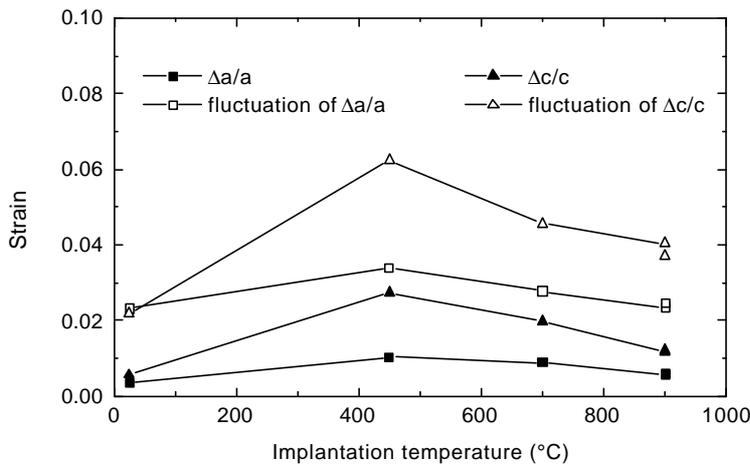


The Figures above show the diffraction pattern for the material implanted at 450 °C and 900 °C, respectively. The WC peaks are marked; each of them show shoulders at the low momentum transfer region caused by the strained phase WC* formed at the implanted surface of the material. It was found that the optimum mechanical values are correlated with the highest lattice strain of the hexagonal WC in the material implanted at 450 °C.



The Figure on the left give the strain results of the WC* phase. The hexagonal unit cell is anisotropically strained; the strain amounts to higher values parallel to the hexagonal axis than perpendicular to it. It should be noted that the strain

fluctuation is higher by a factor of 2 than the strain value itself.

Obviously, at 900 °C the maximum content of newly grown crystalline phases CoWB and Co₃W (indicated by the diffraction lines in the momentum transfer range Q = 35 ... 45 nm) reduces the entireness of the material. It can be stated that the enhanced hardness and wear resistance due to boron implantation is caused by strain instead of dispersed particles of other phases.