

Abstract

Mechanically polished tungsten specimens were irradiated with 5.2 MeV doubly-charged carbon ions (C^{+2}) for various doses of 1×10^{14} , 5×10^{14} , 1×10^{15} , and 5×10^{15} C^{+2} ions/cm². Structural, electrical and mechanical properties of un-irradiated and ion implanted tungsten were investigated using x-ray diffractometer, four point probe technique, and Vickers hardness tester, respectively. Crystallite size and lattice strain were determined from the x-ray diffractographs; values of both structural parameters were a function of ion dose. It was found that both electrical resistivity and hardness values first increase with increase in the ion dose up to 5×10^{14} C^{+2} ions/cm², then fall down for 1×10^{15} C^{+2} ions/cm², and again show an increase for 5×10^{15} C^{+2} ions/cm². The electrical resistivity increases linearly with the hardness, whereas the hardness follows a Hall-Petch relation.