

Abstract

Magnesium is a promising biodegradable material. Along with biodegradability biocompatibility, suitable mechanical properties, and smaller mass to volume ratio this material is being vastly researched for orthopedic and cardiovascular applications. The fast degradation rate of the magnesium is the fundamental disadvantage that hinders its application as a Bioresorbable implant. Researchers are trying to do design new magnesium alloys having appropriate stability. In this study, a different technique is used to improve the stability of the magnesium. Pure magnesium was implanted with nitrogen ions at 350 KeV then the samples were coated with ZnO.

After the completion of the experiment, I am using different techniques like XRD, SEM, Microhardness test, and corrosion test to obtain the results. The samples were then characterized for structural, electrochemical, and mechanical properties using XRD, Potentiostat, and microhardness tester. XRD analysis of the sample revealed that the peak shifting and peak broadening phenomenon was not present because the size of nitrogen is 62% smaller than the host atom i.e. magnesium. Peak intensity of the [100] peak was found to increase for untreated samples. While the intensities of the [002] [101] peaks decreased significantly for the untreated sample. This shows that nitrogen implantation tends to shift the growth habit of crystal. SEM micrographs revealed the growth of flower-like structure in ZnO coated samples while these structures were not observed in N implanted post ZnO coated samples. The micro-hardness test revealed the hardness of coated samples was improved. Maximum hardness was observed in N implanted post-ZnO coated samples. the electrochemical study revealed decreased stability by ZnO coated which is due to the leakage of ZnO atoms from the upper surface of prepared samples.