Evaluation of damage in low energy ion irradiated NiCoCrFePd High Entropy Alloy

High entropy alloys (HEA) are the proposed materials for the next generation nuclear reactors, because of their good mechanical properties and excellent radiation stability. Incorporation of large size element like palladium(Pd) further enhance the radiation tolerance due to accommodation of the defects locally because of large strain produced by the Pd in the base matrix [3,4]. Thus, a Pd based HEA NiCoCrFePd have been synthesized by Arc-melting technique. The as-prepared got ingot cuts into thin disc of thickness 2 mm and the cold-rolled to reduce the thickness up to 0.5 mm, subsequently homogenized at 1200 oC for more than 24 hrs afterward the samples were mechanically polished to obtain mirror like finish surface. X-ray diffraction technique is used to investigate the phase conformation and phase stability at lower temperature down to 40 K. Mechanically polished surface side were then irradiated using 1.05 MeV Xe+3 at ion fluences ranging from 1x1016 to 1x1017 ions/cm2. XRD studies exhibited an increase in the micro-strain along with reduction in crystallite size. Further, electric transport study is used to evaluate the damage accumulation produced by energetic ions. This study further explores the understanding the mechanism of response of HEA towards low energy ion irradiation.