IRRADIATION INDUCED DEFECT AND DISLOCATION EVOLUTION IN EQUIATOMIC MULTICOMPONENT ALLOYS

F. Granberg[1], E. Levo[1], C. Fridlund[1], F. Djurabekova[1,2] and K. Nordlund[1]

1) Department of Physics, University of Helsinki, P.O. Box 43, FIN-00014 University of Helsinki
2) Helsinki Institute of Physics, P. O. Box 43, FIN-00014 University of Helsinki, Finland
email: fredric.granberg@helsinki.fi

Equiatomic Multicomponent (EAMC) alloys and High Entropy Alloys (HEAs) have in the last decade received a lot of attention, due to their good properties at a wide temperature range. These alloys are a random combination of many different elements of high fractions in a simple crystalline structure. It has been shown that these alloys demonstrate good mechanical properties at cryogenic and high temperatures, good corrosion resistance and good electrical and magnetic properties. It was recently also shown that these alloys demonstrate a lower accumulated irradiation damage compared to base elemental material [1], both experimentally and by computer simulations. We found, by means of molecular dynamics simulations, that dislocation mobility is one of the key factors for the reduced accumulated damage in the more complex alloys [1, 2]. The results showed that different combinations of elements showed different responses, indicating that complexity is not the only factor to the defect saturation level [1, 2, 3]. It was also seen that the dislocation structures in the different alloys are specific to the different compositions, and that similarities in the the damage level is also seen as similarities in the dislocation structures [3]. We also observed that drops and certain characteristics in the defect amount can be related to the dislocation evolution in the samples.

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