Irradiation damage in nuclear materials: the microstructure evolution, hardening, and characterization methods

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Abstract:

Materials are essential for nuclear reactors to operate in a safe, efficient and economical way. This talk is mainly based on the interviewer's hands-on experience of nuclear materials researches. Three sub-topics include irradiation damage in pure tungsten(W), ion-irradiation and aging effect in FeCrAl-ODS steels, cTEM/STEM characterization of neutron irradiated MA956 (FeCrAl based ods steel) will be given. The experiments followed a typical routine of irradiation damage researches in pure metal and alloys. The microstructures characterized by TEM and mechanical tests of ion irradiated materials will be introduced.

Bio:

Zhexian Zhang, a researcher in the field of nuclear fission and fusion materials, is currently working as a postdoc in the Department of Nuclear Engineering in the University of New Mexico. He received his B.S. and M.S. in Materials Science and Engineering from University of Science and Technology Beijing and Ph.D. in Energy Science from Kyoto University. He was a post-doc and later appointed as a program specified assistant professor in the Institute of Advanced Energy in Kyoto University. His research work focuses on materials include armor materials for diverter, first wall in fusion reactors, and accident tolerant fuel (ATF) cladding materials in fission reactors. The topics include irradiation damage in materials, aging embrittlement, and microstructure characterization. He is proficient in various techniques such as TEM, FIB, EBSD, AFM, nano-indentation and so on.