Neutron Reaction Data for Neutron Irradiation Damage Estimation

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Neutron reaction data are essential to estimate the neutron irradiation damage. NJOY is the only open-source nuclear data processing code allowing calculating neutron-induced displacement damage cross sections from evaluated nuclear data. However, there are many issues related to NJOY and/or evaluated nuclear data for the damage cross section calculation, such as the inconsistent DPA cross sections and KERMA factors induced by neutron capture reaction with photon data given in MF6 vs. MF12-15, incorrect recoil nuclear data in MF6, and the discrepancy of DPA cross sections using different approaches/nuclear data. The present work briefly introduces the methods of calculating neutron irradiation-induced displacement damage cross sections, summarizes the aforementioned issues, and proposes the corresponding improvements.