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The Dose Dependence Of Fracture Toughness Of F82H Steel

M. Sokolov\textsuperscript{a}, H. Tanigawa\textsuperscript{b}, G. Odette\textsuperscript{c}, M. Ando\textsuperscript{b}, T. Hirose\textsuperscript{d}, R.L. Klueh\textsuperscript{e} and K. Shiba\textsuperscript{b}

\textsuperscript{a}Materials Science and Technology Division, Oak Ridge National Laboratory, 1 Bethel Valley Rd., P.O. Box 2008, Oak Ridge, TN 37831-6138, United States of America
\textsuperscript{b}Japan Atomic Energy Agency, Shirakata-Shirane 2-4, Tokai-mura, Naga-gun, 319-1195 Ibaraki-ken, Japan
\textsuperscript{c}Department of Mechanical Engineering UCSB, UCSB, Santa-Barbara, AK 93106-5080, United States of America
\textsuperscript{d}Blanket Engineering Group, Japan Atomic Energy Agency, Naka, Ibaraki, Japan
\textsuperscript{e}Oak Ridge National Laboratory, PO 2008, MS 6138, Oak Ridge, TN 37931-6138, United States of America
sokolovm@ornl.gov

The ferritic-martensitic steel F82H is a primary candidate low-activation material for fusion applications, and it is being investigated in the joint U.S. Department of Energy-Japan Atomic Energy Agency. As a part of this program, several capsules containing fracture toughness specimens were irradiated in High-Flux Isotope Reactor. These specimens were irradiated to a wide range of doses from 3.5 to 25 dpa. The range of irradiation temperature was from 250\degree C to 500\degree C. This paper summarizes the changes in fracture toughness transition temperature and decrease in the ductile fracture toughness as result of various irradiation conditions. It is shown that in the 3.5 to 25 dpa dose range, irradiation temperature plays the key role in determination of the shift of the transition temperature. Highest embrittlement observed at 250\degree C and the lowest at 500\degree C. At a given irradiation temperature, shift of the fracture toughness transition temperature increases slightly with dose within the studied dose range. It appears that main gain in transition temperature shift occurred during initial \textasciitilde5 dpa of irradiation. The present data are compared to the available published trends.

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