

Selected Technical Papers
STP 1547



Effects of Radiation on Nuclear Materials:

25th Volume

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Selected Technical Papers STP1547 Effects of Radiation on Nuclear Materials: 25th Volume

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Foreword

THIS COMPILATION OF *Selected Technical Papers*, STP1547, *Effects of Radiation on Nuclear Materials: 25th Volume*, contains peer-reviewed papers that were presented at a symposium held June 15–17, 2011 in Anaheim, CA, USA. The symposium was sponsored by ASTM International Committee E10 on Nuclear Technology and Applications.

The Symposium Co-Chairpersons were Takuya Yamamoto, University of California – Santa Barbara, Santa Barbara, CA, USA, Mikhail A. Sokolov, Oak Ridge National Laboratory, Oak Ridge, TN, USA, and Brady D. Hanson, Pacific Northwest National Laboratory, Richland, WA, USA. The STP Editor is Takuya Yamamoto.

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Overview

The Effects of Radiation on Materials series began in 1956 with a meeting jointly sponsored by the E-10 Committee (called the Committee on Radioisotopes and Radiation Effects at the time) and the Atomic Industrial Forum. The symposium, subsequently sponsored by Committee E-10, began in 1960 and became international in 1963. The current 25th meeting continued an international emphasis, with nearly half of presentations originated outside of the United States involving lead authors from 11 countries.

The 25th Symposium on the Effects of Radiation on Nuclear Materials hosted two special sessions. The first, *Light Water Reactor Sustainability Issues and Programs*, focused on the current status of research around the world addressing the multiple challenges of extended reactor life. This session set the stage for others that provided more detailed coverage of irradiation embrittlement of reactor pressure vessel steels, which has traditionally been a core topic of this symposium. Indeed, the STP *Effects of Radiation on Nuclear Materials* series has long served as the primary archive for the evolving knowledge base on this critically important degradation phenomenon.

The second special session dealt with *The Synergistic Effects of Gas Atoms (i.e. helium and hydrogen) and Displacement Damage*, with an emphasis on the unprecedented challenge to structural and plasma-facing materials in nuclear fusion reactors. This session covered state-of-the art experimental approaches, based on dual and triple ion beam irradiation facilities and use of thermal neutron (n , α) reactions in fission reactors, to producing high levels of He and dpa. The session also included recent insight on the severe consequences He-dpa synergisms in conventional alloys, and the status of developing advance alloys that shows great promise of mitigating He enhanced degradation.

The technical program continued to the symposiums tradition of covering a broad spectrum of nuclear applications. This research involves both experiments and state-of-the art modeling tools. The editor wishes to express his gratitude to all the reviewers, without whom the quality of the publication would not be possible, and to the ASTM staff, who played key roles in publication of these proceedings. Most importantly, the editor would like to thank all the Symposium participants for presenting and authoring high quality papers as well as for facilitating many fruitful discussions.

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