

# Table of Contents

## Preface

## Chapter 1: Uranium Alloys and Uranium in Metals

|                                                                                                                                                                                                                             |    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Uranium Diffusion in Metals Used in Nuclear Facilities - A New Approach</b><br>R.A. Pérez                                                                                                                                | 3  |
| <b>Relating Diffusion Couple Experiment Results to Observed As-Fabricated Microstructures in Low-Enriched U-10wt.% Mo Monolithic Fuel Plates</b><br>R. Newell, A. Mehta, Y.J. Park, Y.H. Sohn, J.F. Jue and D.D. Keiser Jr. | 18 |
| <b>Correlations for Interaction Layer Growth in U-Mo/Al Dispersion Fuels</b><br>B.A. Tarasov, S.N. Nikitin, D.P. Shornikov, M.S. Tarasova and I.I. Kononov                                                                  | 29 |

## Chapter 2: Oxide and Nitride Nuclear Fuels

|                                                                                                                                                                                                                 |     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Fast Anion Defect Recovery through Superionic-Type Hopping Displacements in UO<sub>2</sub> Following Radiation</b><br>A. Annamareddy and J. Eapen                                                            | 43  |
| <b>Defect Chemistry and Basic Properties of Non-Stoichiometric PuO<sub>2</sub></b><br>M. Kato, H. Nakamura, M. Watanabe, T. Matsumoto and M. Machida                                                            | 57  |
| <b>MFPR Model Parameters of the Athermal Irradiation-Induced Transport in Nuclear Fuels</b><br>V.I. Tarasov and P.V. Polovnikov                                                                                 | 71  |
| <b>Oxygen Chemical Diffusion Coefficients of (U, Pu)O<sub>2-x</sub></b><br>M. Watanabe, T. Sunaoshi and M. Kato                                                                                                 | 84  |
| <b>Irradiation Creep of Uranium-Plutonium Nitride Fuel and Serviceability of Fuel Element</b><br>I.I. Kononov, B.A. Tarasov and E.M. Glagovskiy                                                                 | 91  |
| <b>Multiscale Modeling of Uranium Mononitride: Point Defects Diffusion, Self-Diffusion, Phase Composition</b><br>S. Starikov, A. Kuksin, D. Smirnova, A. Dolgodvorov and V. Ozrin                               | 101 |
| <b>On Morphological and Microstructural Changes in Uranium Dioxide Powder during Binder-Free Hot Pressing</b><br>A. Lunev, A. Zazolin, D. Pchelyakov, E. Grigoriev, M. Isaenkova, Y. Perlovich and O. Krymskaya | 114 |

## Chapter 3: Changes in Properties of Steels at Thermal and Radiation Impacts

|                                                                                                                                                                                                                                                                  |     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Kinetics of Phosphorus Segregation in the Grain Boundaries of VVER-1000 Pressure Vessel Steels</b><br>B. Bokstein, A.N. Khodan, M.V. Sorokin, A.O. Rodin, E.A. Syutkin, A.V. Khvan, D.A. Maltsev, Z.V. Bukina, M.A. Saltykov, B.A. Gurovich and A.I. Ryazanov | 125 |
| <b>Effect of Test Temperature on Mechanical Properties of Austenitic 0.12C18Cr10NiTi and 0.08C16Cr11Ni3Mo Steels Irradiated by Fast Neutrons in the BN-350 Reactor</b><br>A. Dikov, S. Kislitsin and I. Chernov                                                  | 134 |
| <b>Effective Atomic Displacements in Fe-9at.%Cr Alloy</b><br>V. Svetukhin and M. Tikhonchev                                                                                                                                                                      | 139 |

## Chapter 4: Properties of Defects in Non-Ferrous Metals

|                                                                                                                                                                             |     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Molecular Dynamics Simulations of the Excess Vacancy Evolution in V and V-4Ti</b><br>A. Boev, I.V. Nelasov, V. Maksimenko, A. Lipnitskii, V. Šaveliev and A. Kartamyshev | 153 |
| <b>Study of Niobium Diffusion and Clusterization in hcp Zr-Nb Dilute Alloys</b><br>D. Smirnova and S. Starikov                                                              | 167 |

