Preface

The processing and properties of uranium and its alloys are the subject of much scrutiny at the present time owing to a resurgence of activity in the field of nuclear technology. This book is a summary of work prepared by experts in the field of uranium, with some special submissions based on presentations and papers included at the "Processing of Specialty Metals with Emphasis on Depleted Uranium Users' Conferences" that were sponsored by the American Society of Materials, Manufacturing Sciences Corporation, and the Y-12 National Security Complex at Oak Ridge, Tennessee. These conferences occurred in 2004, 2007, and 2010 with contributors from academia, industry, and government including the Department of Energy—National Nuclear Security Administration laboratories and facilities, and the Atomic Weapons Establishment at Aldermaston, United Kingdom. The chapters provide an authoritative text on the current developments in the field of processing and properties of uranium.

Chapter 1 focuses on the physical, chemical, mechanical, and metallurgical properties of uranium metal; Chap. 2 focuses on several casting and melting techniques; Chaps. 3 and 4 cover machining with coated cutting tools and the grinding parameters of uranium, respectively; Chap. 5 deals with aqueous extraction techniques and processes with emphasis on the chemical principles involved; Chaps. 6 and 7 focus on uranium corrosion with specific detail on the phase relationships and kinetic processes describing the pure uranium–hydrogen binary system and the ternary processes involving oxygen, respectively; Chap. 8 focuses on the fundamentals supporting nondestructive evaluation techniques as well as the methods themselves which are applicable to uranium systems; lastly, Chap. 9 covers developments of new medical isotope production using low-enriched uranium fuel.

The structure of the book is based on the materials provided by many colleagues, and the author wishes to thank the contributors of this book for helping construct a current source of knowledge and information on uranium processing

and properties as well as for granting the editors permission to use such material. The editors also acknowledge the help and support of Merry Stuber and her colleagues at Springer publishers for help in preparing the manuscript in a timely manner.

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