Creep of Zirconium Alloys in Nuclear Reactors

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CREEP OF ZIRCONIUM ALLOYS IN NUCLEAR REACTORS

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D. G. Franklin, Electric Power Research Institute
G. E. Lucas, University of California,
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Foreword

The Metal Properties Council, as part of its continuing role of collecting, analyzing, and updating materials properties data, has arranged for the preparation of this book.

Zirconium-base alloys, primarily Zircaloy-2 and Zircaloy-4, are used as both fuel rod cladding, structural, and other components in the cores of light-water nuclear power reactors. In addition, zirconium-base alloys are employed as the pressure tube material in heavy-water reactors.

Creep is one of the most important parameters associated with the analysis of performance of zirconium-base alloys in a neutron environment. This book contains a summary of in-reactor creep data for zirconium-base alloys and concentrates on the analyses of these data in a manner which should be of interest to individuals involved in both the evaluation of in-reactor performance of the fuel assemblies and core structural components and the design of these components.

This book has been reviewed and approved by Subcommittee 6 of The Metal Properties Council and is published with the cooperation of The American Society for Testing and Materials.

Adolph O. Schaefer

Executive Director, The Metal Properties Council

Warren P. Cernock

Chairman, Subcommittee 6 on Nuclear Metals, The Metal Properties Council

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A Note of Appreciation to Reviewers

The quality of the text that appear in this publication reflects not only the obvious efforts of the authors but also the unheralded, though essential, work of the reviewers. On behalf of ASTM we acknowledge with appreciation their dedication to high professional standards and their sacrifice of time and effort.

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