

PREFACE

FUSION REACTOR MATERIALS

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Nuclear fusion holds the promise of fulfilling our future energy resource requirements. Two major achievements are required to develop the commercial application of this energy source for the nation and the world. They are (a) demonstration of "breakeven," where the energy produced by fusion equals the energy required to cause fusion and (b) demonstration of a fusion reactor producing a practical multiplication of energy at a practical power level. Underlying these achievements there must be the development of materials. A vigorous program of research and development aimed at demonstration of nuclear-fusion breakeven is in progress in the U.S. and in other countries. Concurrently, a substantial program in materials research and development to provide design information for large-scale demonstrations has been launched by the U.S. Energy Research and Development Administration (ERDA).

Three special sessions on "Fusion Reactor Materials" were organized for the 1973 American Nuclear Society (ANS) Winter Meeting and were published in the April 1974 issue of *Nuclear Technology*. Since then, many technological advancements have been made. The papers presented in this issue are representative of the five special sessions on "Fusion Reactor Materials" given at the 1975 ANS Winter Meeting. The 1975

sessions were highlighted by invited speakers: Klaus M. Swilsky (ERDA); Edward J. Hennelly (duPont-Savannah River Laboratory); F. W. Wiffen (Oak Ridge National Laboratory); R. Behrisch (Max Planck Institute, West Germany); C. R. Finfgeld (ERDA); M. J. Guseva (Kurchatov Institute of Atomic Energy, USSR); C. F. Barnett and E. Ricci (Oak Ridge National Laboratory); and O. K. Harling, M. T. Thomas, R. L. Brodzinski, and L. A. Rancitelli (Battelle Northwest Laboratory). Thirty-nine papers were presented covering a wide range of subjects. About half appear in this issue. Others were review papers or are to be published elsewhere. Some intended for this publication were delayed in preparation and will appear in subsequent issues of *Nuclear Technology*.

ACKNOWLEDGMENTS

Preparation for these special sessions and this publication enlisted the efforts of many people in addition to the authors' effort to prepare the papers published in this issue. George R. Hopkins (General Atomics) organized two of the special sessions entitled "Fusion Reactor Materials—Surface Effects." R. Post, editor of *Nuclear Technology*, and his assistants, S. Starr and T. Carpenter, coordinated the review and publication of papers. Most of the authors and some volunteer paper reviewers contributed time during the meeting to make this early publication of the papers possible.