nuclear technology/Fusion®

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OVERVIEW

MATERIALS TECHNOLOGY FOR FUSION: CURRENT STATUS AND FUTURE REQUIREMENTS

R. E. Gold
E. E. Bloom
F. W. Clinard, Jr.
D. L. Smith
R. D. Stevenson
W. G. Wolfer

Robert E. Gold (top right) (BS, 1967, and MS, 1971, metallurgical engineering and physical metallurgy, University of Pittsburgh) is a fellow engineer in the Fusion Power Systems Department of Westinghouse Electric Corporation. His responsibilities include the conduct and coordination of materials-related fusion technology in support of system design studies and materials research and development. **E. E. Bloom** (top left) is group leader of the Radiation Effects and Microstructural Analysis Group in the Metals and Ceramics Division, Oak Ridge National Laboratory. **Frank W. Clinard, Jr.** (center right) (BS, mechanical engineering, and MS, metallurgical engineering, North Carolina State University; PhD, materials science, Stanford University, 1965) has been with Los Alamos National Laboratory (LANL) since 1964. He has since 1970 conducted studies of radiation effects in solids, and presently heads the Fusion Reactor Ceramics and Inorganic Insulators Project at LANL. **Dale L. Smith** (center left) (PhD, Iowa State University) is a member of the Materials Science Division at Argonne National Laboratory with primary responsibilities in the Fusion Power Program with which he has been associated since 1974. Smith serves as program manager for the Materials Science Division's Applied Technology Programs in Fusion Energy. He has been responsible for materials selection and served as task manager for several first-wall/blanket design studies, including the STARFIRE first-wall/blanket design study and the INTOR first-wall design study. **R. D. (Dan) Stevenson** (bottom right) (BA, Reed College; BS and MS, metallurgical engineering, Columbia University, 1979) was employed at the General Atomic Company from 1979 to 1981 where he worked on the development of martensitic steels for fusion applications. Currently, he is employed at INESCO, Inc. as a materials engineer working on materials and fabrication process selection and development for the building of fusion reactors. **W. G. Wolfer** (bottom left) (MS, physics, University of Stuttgart, 1965; PhD, nuclear engineering, University of Florida, 1969) is a professor of nuclear engineering at the University of Wisconsin, Madison. His major research interests include radiation damage in solids, deformation and fracture of structural materials, structural mechanics of reactor components, plasma-wall interaction, and fusion technology.

ENERGY ANALYSIS OF COAL, FISSION, AND FUSION POWER PLANTS

Nicholas Tsoulfanidis

Nick Tsoulfanidis (BS, physics, University of Athens, Greece, 1960; MS, 1965, and PhD, 1968, nuclear engineering, University of Illinois) is professor of nuclear engineering at the University of Missouri-Rolla. In addition to his teaching duties, he conducts research in the areas of radiation transport and the nuclear fuel cycle.

A STUDY OF THE TRITIUM HANDLING SYSTEMS IN MAGNETIC AND INERTIAL CONFINEMENT FUSION REACTORS WITH AND WITHOUT TRITIUM BREEDING

M. S. Ortman
E. M. Larsen
S. I. Abdel-Khalik

Mark S. Ortman (top) (BS, chemistry and mathematics, Friends University, 1975) is a graduate student in chemistry at the University of Wisconsin (UW)-Madison and has a research assistantship in the Nuclear Engineering Department. His research work involves the thermodynamic properties of lithium oxide. **Edwin M. Larsen** (center) (PhD, chemistry, Ohio State University, 1942) is a professor of chemistry at UW-Madison. He joined the UW faculty in 1942, spent the period from 1943 to 1946 working on polonium at the Manhattan Project facility operated by Monsanto (Dayton), and returned to Madison in 1946. His research interests are in zirconium chemistry and inorganic lithium chemistry. **S. I. Abdel-Khalik** (bottom) (PhD, mechanical engineering, UW, 1973) is an associate professor of nuclear engineering at the UW-Madison. He joined the UW faculty in 1976 after two years of post-doctoral work in chemical engineering and one year with the nuclear industry. His research interests are in the areas of fusion technology and fast reactor safety.

CRYOTRAPPING VACUUM PUMPING SYSTEM DESIGN FOR A HELIUM NEUTRAL BEAM INJECTOR

M. A. Hoffman
A. S. Blum

Myron A. Hoffman (top) [ScD, Massachusetts Institute of Technology (MIT), 1955] taught advanced propulsion and space power generation at MIT in aeronautics and astronautics from about 1955 to 1968. He spent three years in the U.S. Air Force Research and Development Command (1956-1959) and two sabbatical leaves at the Italian Ionized Gas Laboratory in Frascati (1966-1967 and 1972-1973), where he worked on magnetohydrodynamic power generation and tokamak reactor conceptual design studies. He joined the Department of Mechanical Engineering at the University of California, Davis, in 1968, where his major research interests are presently in liquid jet flows, boiling heat transfer, and fusion reactor technology problems. He also consults for the Lawrence Livermore National Laboratory (LLNL) on magnetic fusion reactor engineering studies. **Asher S. Blum** (BS and MS, electrical engineering, MIT, 1960; ScD, electrical engineering, Washington University, 1970) is an electrical engineer at the LLNL.

STABILITY OF THE LITHIUM "WATERFALL" FIRST WALL PROTECTION CONCEPT FOR INERTIAL CONFINEMENT FUSION REACTORS

P. D. Esser
D. D. Paul
S. I. Abdel-Khalik

P. D. Esser (top) [BS, nuclear engineering, Massachusetts Institute of Technology, 1978; MS, nuclear engineering, University of Wisconsin (UW), 1980] is an engineer in the Nuclear Fuel Services Department of Commonwealth Edison Company in Chicago, Illinois. His current technical interests are in the areas of theoretical fluid mechanics, thermal hydraulics, and light water reactor physics. **D. D. Paul** (center) (BS, 1974, and MS, 1978, nuclear engineering, UW) is a graduate student at the UW-Madison. Prior to returning to graduate school in 1977, he spent two years at the Reactor Division of Oak Ridge National Laboratory. His research interests are in the areas of fluid mechanics and boiling heat transfer. **S. I. Abdel-Khalik** (bottom) (PhD, mechanical engineering, UW, 1973) is an associate professor of nuclear engineering at the UW-Madison. He joined the UW faculty in 1976 after two years of postdoctoral work in chemical engineering and one year with the nuclear industry. His current research interests are in the areas of reactor safety and fusion technology.