Contents

MICRO-STRUCTURAL DEVELOPMENT AND VOID SWELLING

1. The microchemical evolution and swelling of AISI 316 irradiated in HFIR and EBR-II. H.R. BRAGER AND F.A. GARNER 1

3. The stability of the MC phase in a stainless steel irradiated in various environments. A.F. ROWCLIFFE AND E.H. LEE 5

4. Radiation-induced segregation in Fe-Cr-Ni alloys. A.D. MARWICK, R.C. PILLER AND M.E. HORTON 11

5. Synergistic effects during high temperature irradiation. P. VALENTIN AND G. MARTIN 17

13. Recent experimental and theoretical insights on the swelling of austenitic alloys. F.A. GARNER AND W.G. WOLFER 21

P3. Radiation enhanced diffusion and radiation induced segregation in pure nickel and iron-chromium-nickel ternary alloys. R.C. PILLER AND A.D. MARWICK 25

P4. Be diffusion coefficient and γ precipitation growth rate in self-ion irradiated dilute Cu/Be alloys. H.-J. GUDLADT, R. KOCH, M.-P. MACHT, V. NAUNDORF, R.P. WAHI, AND H. WOLLENBERGER 31

P7. Void swelling in austenitic stainless steels—a review. J.I. BRAMMAN 35

P8. An assessment of the swelling behaviour of AISI 304 stainless steel. F.A. GARNER AND D.L. PORTER 41

Discussion 45

IN-REACTOR CREEP

21. In-reactor uniaxial fracture strain of 20%-cold-worked type 316 stainless steel. M.L. GROSSBECK AND E.E. BLOOM 53

23. High temperature irradiation creep in austenitic steels. R.B. JONES 57

24. Relationships of irradiation creep to swelling implicit in the theories of these processes. L.K. MANSUR AND W.A. COGHLAN 65

P20. The effect of dilute alloying additions on the dislocation microstructure and its relevance to irradiation creep. T. ATKINS AND R.J. McELROY 71

Discussion 75

HIGH TEMPERATURE MECHANICAL PROPERTIES

31. Microstructural instability and thermal creep in 20% cold worked M316 tubing. J. STANDRING, A.M. WILSON AND M.E. CLAYDEN 79

Discussion 83

THERMAL REACTOR MATERIALS

34. Microstructure related to irradiation hardening in pressure vessel steels. S.B. FISHER, J.E. HARBOTTLE, AND N.B. ALDRIDGE 87

36. Irradiation growth in zirconium and its alloys R. A. MURGATROYD AND A. ROGERSON 93

P28. Report on antimony-beryllium neutron sources examined after 7.45 effective full power years in the Dodewaard BWR. W.R. VAN ENGEN AND A. AINSWORTH 97

Discussion 101

Discussion paper. Preliminary results of an investigation of pressure vessel steels by small angle neutron scattering. R.B. JONES AND J.T. BUSWELL 105

DESIGN AND PERFORMANCE OF REACTOR COMPONENTS AND STRUCTURES

46. Some aspects of the selection of cladding and wrapper alloys for high burn-up in fast reactor fuel sub-assemblies. J.I. BRAMMAN, J.S. WATKIN AND F.B. BOARDMAN 107

Discussion 111

INVITED PAPERS

Metallurgy in relation to reactor design and development. J.F.W. BISHOP 115

Materials aspects of design of the fast breeder reactor. M. WEISZ 125

New challenges in fusion research for the materials scientist. G.L. KULCINSKI 131

Factors controlling the irradiation embrittlement response of low alloy pressure vessel steels. E.A. LITTLE 141

Fracture resistance and related safety analysis for Light Water and Liquid Metal Fast Breeder Reactors. K. KUßMAUL, J. FOHL AND E. ROOS 151

Papers P23, P24 and P25 were unavailable for publication at time of going to press.