AUTHORS AND PAPERS

The highly condensed summaries of papers and technical notes (below) are intended to assist the busy reader in determining the order in which to read the technical material. Biographical comments are for human interest.

FISSION PRODUCT RELEASE MODEL

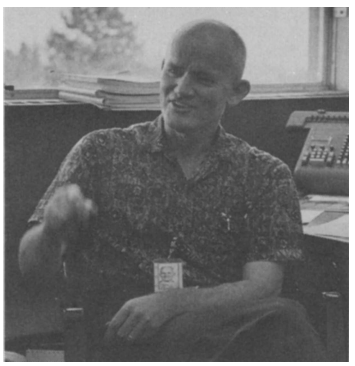
A mathematical model using boundary-layer diffusion predicts the fission product release and fuel evaporation in a loss-of-coolant accident.

Charles E. Miller, Jr. (PhD, Florida State University, 1959) is with the Nuclear Safety Section of the LMFBR Program Office at Argonne National Laboratory. Previously, he was a group leader in the Reactor Chemistry Division of ORNL where he specialized in problems of fission product release and transport and loss-of-coolant accidents.

SEPARATING NpF_6 AND UF_6

Hexafluorides of neptunium were separated in a sorption-desorption process using sodium fluoride at 200°C as a sorbent. Separation based on differences of equilibrium pressure was discarded in favor of one using selective reduction.

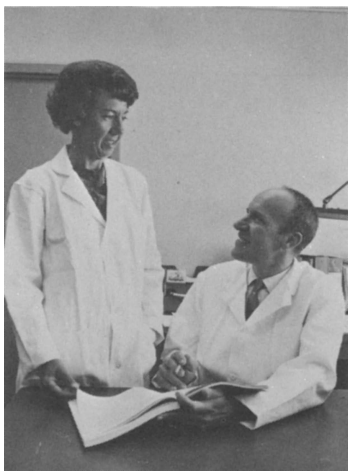
S. Katz (left) (PhD, Michigan State University, 1949) has specialized in uranium chemistry and in complex formation connected with volatility processing. G. I. Cathers (PhD, Yale University, 1948) has been engaged since 1955 in the development of fluoride volatility processes for reactor fuel. Both are members of ORNL's Chemical Technology Division.



BREEDER ANALYSIS

Results from fast reactor critical experiments and computer calculations permit an evaluation of spectral hardness on breeding gain. A breeding gain of 1.3 is possible at average ^{239}Pu concentrations $\leq 2\%$.

Carroll B. Mills, a Los Alamos physicist, is active in parametric studies of fast to thermal spectrum characteristics for safety and advanced applications, using critical experiment results for quality evaluation. Previous work appears in the July and October 1967 and January 1968 issues of Nuclear Applications *and elsewhere.*



FUEL METALLURGY AND REPROCESSING

The effect of silicon in aluminum-uranium fuel elements is not deterimental when dissolving spent fuel in nitric acid, but in the liquid-liquid extraction of uranium, emulsion stabilization occurs at Si:U atom ratios >1, which affects adversely the extraction process.

Bernice E. Paige is a Research Chemist and Kenneth L. Rohde is Chemistry Section Leader at the Chemical Technology Branch at the Idaho Chemical Processing Plant. Both have extensive experience in developing new processes for fuel reprocessing and waste disposal.

CRYSTALLIZATION OF ^{235}U SOLUTIONS

Crystallization temperatures of impure uranyl nitrate solutions were correlated with the total and free nitrate concentrations to predict solution stability for its safe transportation and storage. With the eutectic point kept below the critical uranium concentration, even total freezing of the solution will not increase uranium concentration.

R. C. Kispert (center) Section Leader in the Chemical Department at National Lead Company of Ohio, is involved with a number of uranium processing operations. J. H. Cavendish (seated) is Head of the Chemical Department which provides support for nuclear materials processing operations. N. R. Leist (right) is Supervisor of the Refining and Scrap Recovery Group. G. P. Miller, a Process Engineer, is responsible for process reviews related to nuclear safety limits.

IRRADIATION EFFECTS IN 2103/R3 STEEL

Specimens of Uddenholm UHB 2103/R3 steel, similar to ASTM A-212B, were examined for differences in irradiation effects in several heats of the same steel, and in differently manufactured parts in a reactor vessel. Transition temperature increases varied by a factor of 2 in materials from different parts of the vessel.

M. Grounes is Head, Structural Materials Laboratory at AB Atomenergi in Studsvik, Sweden where he works on irradiation effects on structural materials. He received his master's degree in metallurgical engineering from the Royal Institute of Technology in Stockholm, 1956, then worked with Jernkontoret (Swedish Iron-Master's Association) before completing studies for a SM degree in 1964 at Massachusetts Institute of Technology.

CONTINUOUS CARBON METER

Continuous measurement of the carburizing potential of liquid sodium is made with a small, sensitive, and long-lived diffusion cell-type meter. Carbon fluxes of 0.007 to 1.7 $\mu g/(cm^2\ min)$ have been detected.

J. M. McKee (above) now with the LMFBR Program Office at ANL, was Engineering Advisor at United Nuclear Corporation from 1952 to 1967, working on liquid metal technology and fuel development. W. H. Caplinger (left), a Nuclear Engineer at UNC since 1963, has investigated mass transfer in liquid metals and aided in developing an electrolytic oxygen meter. M. Kolodney is a consultant at United Nuclear and Professor of Chemical Engineering at The City College in New York.

SSTR CRITICAL ASSEMBLY MEASUREMENTS

Solid-state fission track recorders (pre-etched muscovite mica) offer a simple, direct, and sensitive method of accurately determining spatial fission rate distributions, an important characteristic of critical assemblies.

James Roberts (seated, right), a Professor of Physics, and Song-Teh Huang (standing, right), a graduate student in engineering science, both of Northwestern University, have teamed with Roland Armani (standing, left) and section head Dr. Raymond Gold of the Experimental Reactor Physics Section, Reactor Physics Division, Argonne National Laboratory, for fission rate measurements in low-power fast critical assemblies. The present work represents an application at fission track counting techniques developed as a collaborative effort between Northwestern University and Argonne National Laboratory.

GAMMA-RAY SPECTRAL RESOLUTION

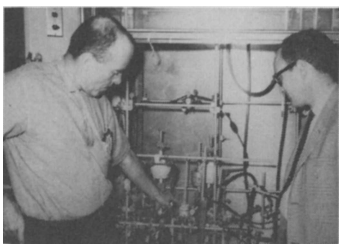
Determination of radionuclides, singly and in complex mixtures by resolution of gamma-ray spectra, is simpler, less expensive, and as accurate as conventional methods of analysis when preferential counting techniques and simple chemical separations are used.

This author team has a cumulative total of 49 years of experience at ORNL in purification and determination of radionuclides. M. E. Pruitt (left) is engaged with correlation of gamma-ray spectrometry, chemical separations, and computer programs. Sue H. Prestwood has assisted in programming and data processing, and H. A. Parker is responsible for gamma-ray spectroscopy.

CHARACTERIZATION OF CHROMIUM ORES

Neutron activation analysis for various elements was used to characterize the geographic origin of chromites.

The authors were all members of an Activation Analysis Group at Union Carbide under the direction of W. H. Wahl. From left to right are W. H. Wahl (PhD, Purdue), currently Director of Radiopharmaceuticals; H. H. Kramer (PhD, Indiana University), Manager of Nucleonics Research; V. J. Molinski, a chemist in Nucleonics Research; W. J. Hampton, Supervisor of Radiometric Assay; and J. J. Finn, who is working in radiopharmaceutical research.



LIQUID-METAL–VAPOR INTERFACE TRANSPORT

The understanding of heat transfer in liquid metals is enhanced by a radioactive tracer technique which measured condensation-evaporation coefficients at the vapor-liquid interface of mercury. Although measurements were made at isothermal equilibrium, this technique can be applied to nonisothermal studies.

K. F. Wylie (right) (MA, Kent State University, 1960) is a Graduate Research Associate at Ohio State University. He formerly was a senior research physicist at Mound Laboratory and consultant to the Grandview Hospital's Division of Nuclear Medicine. From 1954 until his death last year, Prof. C. E. Dryden was a member of the Department of Chemical Engineering at Ohio State. From 1963 to 1965 he was on loan, starting a Chemical Engineering Department at the Indian Institute of Technology, Kanpur. His publications, patents, and honors are extensive.

Li AND F IN MOLTEN SALT REACTOR GRAPHITE

Lithium and fluorine penetration of graphite was detected to sensitivities of 0.01 to 0.1 ppm by detecting proton-induced reactions. Graphite from the Molten Salt Reactor Experiment is more permeable to Li and F than unirradiated control samples.

Richard L. Macklin (second from right) (PhD, Yale 1944), a Senior Physicist, and John H. Gibbons (second from left) (PhD, Duke 1954) are both members of the Physics Division at ORNL, where they have been for about 15 years. E. Ricci (right) (PhD, Buenos Aires 1954), and T. H. Handley (center) (BS, Stanford University) are with the Analytical Chemistry Division, and D. R. Cuneo (left) (BS, Chattanooga) is with the Reactor Chemistry Division. As a team their interests include nuclear data, cross sections, pulsed accelerator operation, nuclear methods of analysis, nuclear decay, and post-irradiation evaluation of materials.

NEUTRON DOSIMETRY STUDIES IN EBR-II

Tests in the EBR-II at 20 kW and 45 MW show that such threshold reactions as $^{54}Fe(n,p)^{54}Mn$ are effective for flux and fluence dosimetry in fast reactors.

J. L. Jackson (left) and J. A. Ulseth are members of the Chemistry and Metallurgy Division of Battelle's Pacific Northwest Laboratory. For several years, both have been involved with studies of neutron dosimetry and materials irradiation damage analysis.

PREDICTING FATIGUE LIFE AFTER RADIATION

Tensile test data and Manson's relationship predict the fatigue life of irradiated Type-347 stainless steel for strains of 1 to 2%.

Mike Kangilaski (left) has been involved in research on nuclear fuels and structural materials for the last eight years at Batelle-Columbus. His BS is from Ohio State. Fred Shober (BS, Heidelberg) has been active in metallurgy research for the past 20 years, mostly with reactor materials.