

engineering and science, this very readable book will provide insights from the minds of the individuals who are most able to affect those relations.

Dr. Ernest F. Johnson is professor of Chemical Engineering at Princeton University. From 1962 to 1966 he was Associate Dean of the Faculty with special responsibility for physical and academic planning, particularly in science and engineering. Since 1962 he has been a member of the Board of Trustees of Associated Universities, the corporation that operates Brookhaven National Laboratory and the National Radio Astronomy Observatory, and since 1965 he has been Chairman of the Board and Chairman of the Executive Committee of that corporation.

ORGANICS INTERNATIONAL

Title Organic Liquids as Reactor Coolants and Moderators

Publisher International Atomic Energy Agency, 1967

Pages 148

Price \$3.50

Reviewer Robert O. Bolt

Duplication of research is difficult to prevent in a single country and impossible to prevent in multi-country programs. Such is the case with work on organics as reactor coolants and moderators, involving, as it does, many countries with several different objectives and no possibility of direct coordination. Much overlap is evident, even to the novice, on reading this panel report. Discussion of the research, a step in making duplication known, was a major purpose for which the IAEA convened a panel of 15 participants and observers from seven countries and Euratom.

Status reports from Euratom, Canada, France, Hungary, India, Spain, and the United States are presented. Topical summaries of the five technical sessions, based on individual technical papers, are also included. The summaries deal with measurement of physical properties of organic compounds, stability, heat

transfer and fouling, reclamation and purification, and analytical techniques. Abstracts of 24 individual technical papers are also included.

The topical summaries, each five to ten pages in length, are all in English, and are generally well written with appropriate conclusions and recommendations. The status reports range from a single page for the Canadian and French contributions to 26 pages for Spain. This disparity does not reflect the size of individual programs, but rather, the availability of current information in other publications and the inclination of the author to emphasize detail. The reports from Euratom and France are in French; the others are in English.

Each technical paper abstract is only about one page long. All are in English and about three-fourths also have additional abstracts either in French or Spanish.

As is evident from the report, anyone interested in complex problems can have his fill with the organic reactor. There is an interplay of radiolysis and pyrolysis on coolant consumption with the prevalence of temperatures of 300 to 400°C in a damaging radiation environment. Even the measurement of components of this environment is difficult. Fouling of vital heat transfer surfaces is affected by impurities such as chlorides, oxygen (and oxidized organics), and water, and yet some water must be present to avoid hydriding the zirconium fuel element cladding. Means of detecting precursors to damaging effects are important to the economic success of the reactor system. Factors such as these, together with more fundamental knowledge of chemical mechanisms, must be tied together in a neat package if the organic reactor concept is to succeed. The progress made by this panel in arranging this package leaves a good overall impression.

However, as is inevitable with publications without editors, some conflicting data, mostly minor, are cited in the report. The naiveté of some of the work is evident to anyone in the field. This emphasizes the lack of communication between countries and/or the deliberate ignoring of past work for the sake of gaining experience. Either case represents a loss to science. The detail of presentation is tiresome in several

instances. Such detail is of interest only to those actively engaged in the organic reactor program, and their ranks have been thinned recently by the demise of the United States on-again off-again program and the termination of the work in Spain.

People in radiation chemistry will find valuable the work on the terphenyls and some of their hydrogenated derivatives. However, the research is quite engineering-oriented in that high temperatures and high radiation doses in reactors were generally used. Information on analytical techniques, highly developed in many instances, will also be of interest to radiation chemists.

Robert O. Bolt is a senior research associate at the Chevron Research Company. For over 15 years he was involved with radiation effects on organic fluids, including oils, greases, organic fuels, and reactor coolant-moderators. An author and an editor of the book, "Radiation Effects on Organic Materials" (USAEC 1963), and since 1953 a member of several advisory groups on radiation damage, he received his BS (1939) from James Millikin University, and his MS (1942) and PhD (1944) degrees from Purdue.

BOOK ANNOUNCEMENTS

Although the following books will not be reviewed, they may be of interest to some of our readers:

Irradiation of Polymers, Robert F. Gould, Ed., American Chemical Society, 1967, v + 275, \$8.00

All of the remaining books were published by the International Atomic Energy Agency (1967):

Solid-State Dosimetry, 143 pp, \$3.00

Radiosterilization of Medical Products, Pharmaceuticals and Bioproducts, 94 pp, \$2.00

Alkali Metal Coolants, 786 pp, \$16.00

Standardization of Radionuclides, 744 pp, \$15.00

Regulations for the Safe Transport of Radioactive Materials, 117 pp, \$2.50

Processing of Low-Grade Uranium Ores, 247 pp, \$5.00

Nuclear Data for Reactors, Vol. I, 576 pp, \$12.00; Vol. II, 437 pp, \$9.00