

The strong solvent dependence of the photoreactions of pyrazolenines is indicated in Table I. It is apparent that solvents of low dielectric constant direct the partition of the photoexcited state in favor of cyclopropene formation. Experiments are in progress to determine whether the different pathways involve excited states of different multiplicities.

Finally it should be pointed out that the conversion of pyrazolenines to cyclopropenes might well be a two-quantum process, in which the first step is the formation of diazoalkene III. Supporting this hypothesis is due to the instability of the desired compound, receives strong support from our observations on IIB.

the observation of an induction period in nitrogen evolution and the buildup of a steady-state concentration of III as evidenced by the development of a strong red color of the photolysis solutions. The light-induced conversion of III to II finds its analogy in previously reported examples of cyclopropene formation from diazoalkenes.⁷

- (7) G. L. Closs, L. E. Closs, and W. A. Böll, *ibid.*, **85**, 3796 (1963).
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BOOK REVIEWS

Inorganic Thermogravimetric Analysis, Second and Revised Edition. By CLÉMENT DUVAL, Directeur de Recherche au C.N.R.S., Directeur du Laboratoire de Recherches Micro-analytiques (E.N.S.C., Paris), President du Groupe de Chimie analytique. Translated from the French manuscript by RALPHE E. OESPER, Ph.D., Professor Emeritus of Analytical Chemistry, University of Cincinnati. American Elsevier Publishing Company, Inc., 52 Vanderbilt Avenue, New York 17, N. Y. 1963. 16 × 23 cm. xv + 722 pp. Price, \$22.00.

The second and revised edition of this book covers a wider range of topics than its title implies, but as the author states in the preface the word *analytical* has been retained because up to now analytical chemistry has profited most from the recent progress in thermogravimetry. In addition to applications in analytical chemistry, the book deals with "kinetic studies, investigations of catalysis, reactions in the solid state, and studies of the behavior of standard materials for titrant solutions, and also of various substances which are not employed in analysis."

The book is divided into two parts: Part I (The Thermobalances), 162 pp., and Part II (The Thermolysis Curves), 521 pp. There are five chapters in Part I; they deal with the topics: a brief historical review, deflection type thermobalances, null type thermobalances, applications of the thermobalances, and precautions to be taken in the use of the thermobalance. Since the first edition was issued (1953), three world-renowned scientists have died: Honda (in 1954), and Guichard and Chevenard (in 1960). Appropriately, a photograph and short biographical sketch of each of these pioneers in thermogravimetry are included in the first chapter. As an appendix to Part I, the author gives an extensive table (15 pages) bringing together the methods which he suggests for automatic inorganic analysis (plutonium and americium excepted).

Chapters 6 to 84 are covered in Part II, a chapter being devoted to compounds or ions of each of the following 78 elements listed in the order of their atomic number: lithium, beryllium, boron, carbon, nitrogen, fluorine, sodium, magnesium, aluminum, silicon, phosphorus, sulfur, chlorine, potassium, calcium, scandium, titanium, vanadium, chromium, manganese, iron, cobalt, nickel, copper, zinc, gallium, germanium, arsenic, selenium, bromine, rubidium, strontium, yttrium, zirconium, niobium, molybdenum, ruthenium, rhodium, palladium, silver, cadmium, indium, tin, antimony, tellurium, iodine, cesium, barium, lanthanum, cerium, praseodymium, neodymium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium, hafnium, tantalum, tungsten, rhenium, osmium, iridium, platinum, gold, mercury, thallium, lead, bismuth, thorium, uranium, plutonium, and americium. The closing chapter is devoted to studies in organic chemistry and briefly discusses the results obtained with a number of purely organic compounds closely linked with inorganic analysis.

An idea of the rapid growth of thermogravimetry is gained by the fact that by January 1, 1961, there were 52 models of thermobalances, 10 of these being available from dealers throughout the world. The extensive and thorough coverage of the literature is indicated by the author's statement that he had read 2200 papers in periodicals from all quarters of the globe or, in more precise terms, had regularly consulted the leading analytical journals and abstracts through 1960, which he has listed in the preface.

The book concludes with author and subject indexes. Printing, paper, and cloth binding are of good quality.

It has been a special pleasure to review this book because of my close association with Professor Duval for some twelve years as a member of the IUPAC Commission on New Analytical Reagents. He is to be congratulated and thanked for this useful and up-to-

date treatise on thermogravimetry. A word of appreciation is also due the translator for making the French manuscript available in English.

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Research in Surface Forces. Edited by B. V. DERYAGIN. Authorized translation from the Russian. Consultants Bureau Enterprises, Inc., 227 W. 17th St., New York 11, N. Y. 1963. 190 pp. 21.5 × 27.5 cm. Price, \$27.50.

This monograph is a jubilee number commemorating "the twenty-fifth anniversary of the organization of the Laboratory of Surface Phenomena of the Institute of Physical Chemistry of the Academy of Sciences of the USSR, March, 1960. The organizer and permanent director of this laboratory is B. V. Deryagin, Corresponding Member of the Academy of Sciences of the USSR. The original staff of three—B. V. Deryagin, M. M. Kusakov, and V. P. Lazarev—was augmented somewhat later by the addition of L. S. Lebedeva (1936), N. N. Zakhavaeva (1937), and A. S. Titievskaya (1938)."

Fortunately, all of the contributions have been translated. The first one comprises a comprehensive review of the first 25 years in the Laboratory of Surface Phenomena. It is particularly useful to American readers in that the testing of the principal discoveries since 1935, their importance to science, and the names of the workers involved are set forth in clear, readable style by N. N. Zakhavaeva. It is helpful for an understanding of the papers that follow to have the evolution of the researches of this Institute so clearly depicted with the particular contributions of each of the authors set forth.

These six pages of historical review ends with the statement: "An extensive effort has been made to popularize the work of the Laboratory. More than 600 journal articles have been written since the Laboratory was founded; the staff has actively participated in various conferences and discussions (more than 100, many abroad) and carried out innumerable consultations. A colloquium functions regularly in the Laboratory and attracts numerous scientific workers from other institutions and representatives of industry. Representatives of other institutions have defended their dissertations under the direction of, or in consultation with, the Laboratory staff. The fact that the work of the Laboratory has embraced so extensive a field of surface phenomena is reflected in the title, Laboratory of Surface Phenomena, which it has carried since 1953.

"Thus, twenty-five years have seen a great change, from a laboratory engaged in the study of the properties of thin polymolecular liquid films to an extensive laboratory working with a wide range of surface effects."

The breadth and depth of the contributions of this volume can be seen from the following titles:

- Twenty-five Years in the Laboratory of Surface Phenomena of the Institute of Physical Chemistry of the Academy of Sciences of the USSR by N. N. Zakhavaeva
- Surface Forces and Their Effect on the Properties of Heterogeneous Systems by B. V. Deryagin
- A Study of the State of Connate Water in Oil Reservoirs by M. M. Kusakov and L. I. Mekenitskaya
- The General Theory of Type II Capillary Effects by L. M. Shcherbakov
- Diffusional Surface Forces in the Neighborhood of a Liquid Interface by S. S. Dukhin