

comprehensively covers the various assays used to detect alloantigenic activity both in vitro and in vivo. Finally, some interesting speculations and data are presented by the editors on the molecular nature of HL-A antigens.

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The Actinide Elements. K. W. BAGNALL. Elsevier, New York, 1973. xii, 272 pp., illus. \$27.75. Topics in Inorganic and General Chemistry, Monograph 15.

The 15 elements known as the actinides lie mostly beyond what was once thought to be the end of the periodic table. Now not only is the place of these elements within the table recognized but some of the elements beyond the actinide series have been synthesized. In addition to the knowledge of the chemical behavior of thorium, uranium, neptunium, and plutonium accumulated during the 1940's and 1950's, much information on the other members of the series has been obtained in recent years. This has been facilitated by the separation of grams of protactinium by British workers and by the production of weighable quantities of the heavier actinides through einsteinium ($Z = 99$) by the U.S. heavy-element program.

Bagnall, who has conducted much research on the inorganic chemistry of all the lighter actinides, has now written a compact survey of the chemistry of all the actinide elements. His approach is one of broad coverage rather than extensive detail and is supported by numerous references to the literature. To a chemist entering this field, this book is a good place to look for references for pursuit of a particular topic of interest, and for the student of inorganic chemistry an overall view of these elements and their compounds is easily found here. Bagnall does not make many generalizations, although he includes frequent comparisons with the chemistry of the lanthanide elements.

The emphasis in subjects covered is primarily on inorganic rather than physical or nuclear chemistry. After some introductory chapters on the discovery, separation, and purification of the actinides, the book deals with the preparation and properties of the metals, the familiar inorganic compounds such as oxides, halides, sulfates, and halates,

and the more unusual species including chelates, organometallic compounds, and other carbon- and sulfur-containing compounds. These solid substances are characterized as to crystal structure, color, and reactivity. Very few data on thermodynamics or solution behavior are given except in an early chapter on oxidation potentials. The final chapter covers briefly, but quite interestingly, magnetic properties, absorption spectra, and f orbitals.

Because of the ongoing research on the actinides, a number of details now available in the literature are missing from the book, but this can easily be remedied if a revision is forthcoming. For the present this book is a useful manual for the working chemist and an easily comprehensible source book for the advanced student.

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