

laxation, fluctuation-dissipation theorem, and many others. There are also fourteen "divertissements" throughout the book which are extra comments, equivalent to informal discussions occurring during coffee break. The author has made a significant contribution to students of statistical mechanics, but it is inexcusable that the publisher finds it necessary to charge \$19.

Alpha-, Beta-, and Gamma-Ray Spectroscopy. Kai Siegbahn, ed. 1742 pp. North-Holland, Amsterdam, 1965. \$50.00.

Reviewed by Evans Hayward, National Bureau of Standards.

Now we have a new Siegbahn Handbook of α -, β -, and γ -ray spectroscopy. Externally this differs from the first edition of 1955 in two respects: (1) the word, α -ray, has been added to the title and (2) it comes in two volumes each as large as the 1955 model.

A glance through the table of contents reminds one immediately that since the appearance of the first edition we have survived the activity associated with the discovery of the non-conservation of parity in β -decay and the flurry of experiments provoked by the Mössbauer effect. The question that arises at once is: Have the authors of the papers in the first edition rewritten them to bring them up to date or have new papers been written? And the answer is: Both. My own reaction is that those that have been completely redone either by the former author or a new one are more successful than those where only minor changes were made.

Like any book with more than a score of authors, this one is extremely uneven. A few of the papers contribute almost nothing; most are the kind of reviews that serve either as the introduction to a new topic or as a constant reference for someone more familiar with the subject. There are 26 chapters in all. The experimental apparatus of nuclear spectroscopy is covered in a series of papers on detectors, spectrometers, circuitry, and other gadgetry. Another group treats the theory of angular correlations and orientation phenomena. Another extensive series of articles elaborates the theory of β -decay and parity nonconservation. Others are concerned with

nuclear models and their connection with spectroscopy. The main body of the text is followed by a series of appendices that include, among other things, gamma-ray absorption coefficients, angular correlation coefficients, and internal conversion coefficients. I would like to complain that the numbers in the latter tables have been reduced so much as to be almost invisible.

If you are an experimentalist with any interest at all in nuclear spectroscopy, I would strongly recommend that you spend a few hours with these volumes, long enough to familiarize yourself with their contents. You'll be back for the details when you need them. They are worth the fifty-dollar toll, especially if your laboratory will buy them for you.

Surface Phenomena in Metallurgical Processes. Conf. Proc. (Moscow, Nov. 1961). A. I. Belyaev, ed. Transl. from Russian. 228 pp. Consultants Bureau, New York, 1965. Paper \$27.50.

Reviewed by Daniel B. Butrymowicz, National Bureau of Standards.

Surface phenomena and the part they play in metallurgical processes occurring at high temperatures have been attracting a great deal of attention in the Soviet Union since World War II. There are two reasons for the surging interest: (1) to develop technological processes for exploiting the many new ore deposits being opened up in the USSR, and (2) to mechanize and automate all the technological processes in metallurgy and to increase the extraction of metals at every stage in their production. A survey of progress towards these goals was the purpose of an interinstitute scientific and technical conference on surface phenomena in metal production processes which met in November 1961. There are 29 papers on surface phenomena (surface tension, interfacial tension, wetting, capillary absorption, adhesion, etc.) in pyro- and electro-metallurgical processes.

More attention is given to the non-ferrous metals (particularly aluminum) than to the ferrous metals. A. I. Belyaev reviews the role of surface phenomena in pyro-metallurgy and electro-metallurgy of nonferrous metals; several illustrations are taken from

different branches of the process metallurgy of aluminum, magnesium, and titanium. Other papers are devoted to the structural features of the interface between liquid aluminum and a cryolite-alumina melt; the resistance of carbon electrodes to disintegration in a cryolite-alumina melt; and aluminum loss in molten salts. Electrolytic production of magnesium is mentioned, but only with regard to the harmful influence of sulfate impurities on the cathode process during the electrolysis of molten chlorides.

A second review paper, by V. I. Yavoiskii, discusses generally the part played by surface phenomena in the steelmaking process, principally in systems consisting mainly of liquid phases (metal and slag) and a gaseous phase, and also those consisting of liquid and solid phases (inclusion, unassimilated slag-forming materials, or refractories). Interaction between liquid iron and molten slag is the subject of other papers, where interest is centered on ion exchange, interfacial tension, and the double electric layer at the iron-slag boundary. A few experiments are concerned with the influence particular additions have on the electrocapillary properties of iron in molten slag and on the adhesion to the slags.

A fair number of presentations are on the experimental measurement of surface tension and the merits of various techniques of measurement. It was found that methods based on the maximum pressure in a drop or bubble proved to be the most suitable under high-temperature conditions, although there still remains much room for improvement of such techniques. There are surface-tension studies on magnesium cast irons, sulfide-silicate melts, and sulfide melts of the iron-nickel-sulfur system (one of the principal nickel mattes). Additional studies report the dependence of surface tension on temperature and atomic number.

The phenomenon of contact melting is the subject of two papers, one concerned with the melting of crystals of eutectic systems (low melting metals) and the other with irradiation effects. The topic of corrosion is touched upon in an investigation into