

THE PRIMARY BATTERY, VOL. 2

*Edited by N. Corey Cahoon and George W. Heise.
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This is the second in a 2-volume set planned to present a comprehensive view of the primary battery field. It consists of eleven papers covering: Leclanché and zinc chloride cells; magnesium cells; aluminum cells; organic cathodes and anodes; low temperature systems; thermal batteries; water-activated batteries, standard tests for primary batteries; reversability of battery systems; measurement and interpretation of internal resistance; and a survey of energy sources and conversion mechanisms.

The individual chapters are well written, and contain much information which should be of value to serious workers in the field. The large amount of detail, however, makes the book hard to read. Readers with little or no background in the battery field may find it difficult to sort through this large amount of detail in order to discover the general principles governing the operation of the specific battery system being described.

The coverage of the field is, moreover, restricted, with heavy emphasis on the Leclanché cell and its analogs. Not only is the paper describing this system by far the longest in the book (147 pages), but most of the discussion in the chapters on battery testing and measurement of internal resistance is focused on this system. Similarly, the chapter on low temperature systems is almost exclusively devoted to a review of modifications to the Leclanché cell (non-aqueous systems were covered in Volume 1 of the series) and the discussion of organic depolarizers is largely limited to those potentially useful as replacements for manganese dioxide. A further restriction on the comprehensiveness and up-to-dateness of the book is the lack of any discussion of cells with lithium anodes which have been the subject of extensive development over the past 15 years.

Nonetheless, the complete 2-volume set should serve well as an authoritative reference on primary battery technology. The factors listed above, however, will in the opinion of the reviewer, limit the usefulness of this volume as a textbook on the subject. □

- Baumeister, K. J. and F. F. Simon, "Leidenfrost Temperature—Its Correlation for Liquid Metals, Cryogenics, Hydrocarbons, and Water", *J. Heat Trans.*, May, 1973, p. 166.
- Bell, K. J., "The Leidenfrost Phenomenon: A Survey", *Heat Trans. with Phase Change, CEP Symp. Ser.*, 63, (79) 73 (1967).
- Berenson, P. J., "Film-Boiling Heat Transfer From a Horizontal Surface", *J. Heat Trans.*, Aug., 1961, p. 351.
- Board, S. J., R. W. Hall, and G. E. Brown, "The Role of Spontaneous Nucleation in Thermal Explosions: Freon/Water Experiments", Central Elec. Generating Board, Berkeley Nuclear Laboratories, June, 1974, RD/B/N-3007.
- Board, S. J. and L. Caldarola, "Fuel-Coolant Interactions in Fast Reactors", Paper presented at the Annual ASME Meeting, New York, Nov., 1977.
- Brauer, F. E., N. W. Green, and R. B. Mesler, "Metal-Water Explosions", *Nuc. Sci. Eng.* 31, 551 (1968).
- Fauske, H. K., "On the Mechanism of Uranium Dioxide-Sodium Explosive Interactions", *Nuc. Sci. Eng.* 51, 95 (1973).
- Fauske, H. K., "Some Aspects of Liquid-Liquid Heat Transfer and Explosive Boiling", Proc. Fast Reactor Safety Meeting, Beverly Hills, CA, Conf. 740401-P2, 992, April 2-4, 1974.
- Fauske, H. K., Private Communication, 1977.
- Groenveld, P., "Explosive Vapor Formation", *J. Heat Trans.* 94, 236 (1972).
- Henry, R. E., "A Correlation for the Minimum Wall Superheat in Film Boiling", *Trans. Am. Nucl. Soc.* 15(1), 420 (1972).
- Henry, R. E., J. D. Gabor, I. O. Winsch, E. A. Spleha, D. J. Quinn, E. G. Erickson, J. J. Heiberger, and G. T. Goldfuss, "Large Scale Vapor Explosions", Proc. Fast Reactor Safety Meeting, Beverly Hills, CA, Conf. 740401-P2, 922, April 2, 1974.
- Henry, R. E. and D. R. Armstrong, "Shock-induced Drop Breakup in Liquid-Liquid Systems" ANL-RDP-56, Dec., 1976.
- McCracken, G. M., "Investigation of Explosions Produced by Dropping Liquid Metals into Aqueous Solutions", Safety Research Bulletin No. 11, United Kingdom Atomic Energy Authority (1973).
- Science, C. T. and C. P. Colver, "Minimum Film-Boiling Point for Several Light Hydrocarbons", *J. Heat Trans.*, Nov., 1970, p. 659.
- Spiegler, P. et al., "Onset of Stable Film Boiling and the Foam Limit", *Int. J. Heat Mass Trans.* 6, 987 (1963).
- Stevens, J. W. and L. C. Witte, "Transient Vapor Film Behavior During Quenching", *Trans. Am. Nucl. Soc.* 15, 418 (1972).
- Swift, D., Argonne National Laboratory, Chem. Eng. Div. Semi-Annual Report, ANL-7125, July-Dec. 1965, p. 192.
- Witte, L. C. and J. E. Cox, "Nonchemical Explosive Interaction of LNG and Water", ASME Preprint 71-WA/HT-31, Paper presented at ASME Winter Annual Meeting, Washington, D. C., Nov. 28 to Dec. 2, 1971.
- Witte, L. C., J. E. Cox and J. E. Bouvier, "The Vapor Explosion", *J. Metals* 22 (2), 39 (1970).
- Witte, L. C., T. J. Vyas and A. A. Gelabert, "Heat Transfer and Fragmentation During Molten-Metal/Water Interactions", *J. Heat Trans.* 95, 521 (1973).