

P.R. Roberge (ed): Corrosion basics: an introduction (2nd ed.)

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Corrosion, in particular of metals, is unfortunately omnipresent; and although nobody likes it, its investigation, understanding and inhibition or prevention are major challenges for electrochemistry, material scientists and researchers in several other fields of science and technology. This major importance still stimulates major research efforts, and the presence of corrosion phenomena in the education of chemists etc. results in a considerable need for textbooks. The present textbook is based on a corrosion course in 1970. After 13 printings—an impressive number corresponding to the overall importance of this field—the present edition contains an updated and rearranged text. The very homogeneous text is based on initial contributions from numerous authors, assignment of chapters and sections in the present text to single authors is not kept anymore.

The first part is devoted to some brief introductory remarks and the electrochemistry of corrosion. Although fairly condensed, the scope of this part fits exactly its purpose—an introductory basic text. The number of experimental methods employed in corrosion studies is tremendous, and already only listing them would be way beyond the purpose of this book. Instead, some fundamental aspects of electrochemical corrosion protection directly related to the basic electrochemical aspects of corrosion are introduced. The advanced reader looking for experimental details will find them in numerous encyclopedic works currently available.

The second part might be—at least at first glance—somewhat surprising to the average electrochemist. It deals

with environments. From the engineers and technicians point of view, quite a natural approach—because corrosion depends very much on the environment of the corroding metal (and only metals and alloys are treated in this book). Steel embedded in concrete or titanium alloy exposed to hot gas in a turbine or iron in contact with soil will show considerably different behaviours. Starting with a general overview of factors influential in establishing the corrosive specifics of a particular environment, most technologically important situations are considered; only biological environment (e.g. the metal alloy in dentistry or the artificial hip) are somehow missing.

In part III, corrosion is treated from a materials point of view. In this part, the scope of materials is somewhat widened; corrosion of polymeric materials is included (presumably because of their importance as conceivable corrosion protectors for cables, tubing etc.). Forms of corrosion—now focusing on metals again—are described in detail with numerous impressive examples of fatalities and damages.

Because we have to live with corrosion at least for the foreseeable future, the only way to handle the problem is to control it. Protective coatings, cathodic protection, corrosion inhibitors and design considerations based on failure analysis intended to minimise the chances of corrosive attack are treated extensively. Somehow, anodic protection—although mentioned in part I—is not mentioned, presumably it is far less popular and considerably more complicated than cathodic protection.

And as there is no perfect method to prevent corrosion, methods to monitor actually proceeding corrosion are needed as well as methods to test methods for corrosion protection, to estimate the corroding properties of a given environment or a particular material etc. These aspects are treated carefully in the last part.

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A carefully prepared list of acronyms, a glossary of corrosion-related terms as suggested by NACE, SI unit conversion tables and a rich index help the reader.

The text is very carefully written and edited, numerous figures and photographs help to understand the described processes and fatalities. Although sometimes the photo-

graphs lack contrast, they never fail to make the point. The book is a must for libraries serving chemical and materials science research institutes, even engineers will read it with considerable gain. Unfortunately, the price puts it somewhat out of range for students, even for the desk of many researchers.