

## BOOK REVIEW

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### Chalcopyrite: Its Chemistry and Metallurgy

By Fathi Habashi

New York: McGraw-Hill International Book Company (1978). 165 pp.: \$22.00.

Reviewed by J. R. Lusty

This publication, which was originally written as a review article for 'Progress in Extractive Metallurgy', has been expanded into a book, and covers the literature up to early 1977. Its content deals principally with chalcopyrite but other related minerals are also considered where relevant. While obviously intended for metallurgists, the book has plenty to recommend it to chemists and chemical engineers.

The first three chapters deal with the structure of chalcopyrite and basic extraction techniques. It is evident from these early chapters that this was originally a review article, as a variety of units is cited. Some confusion may arise and it would have been better if the units and nomenclature had been standardized, as suggested by the author himself in a note at the beginning of the book.

Apart from this point the book is extremely readable and well presented. The basic chemistry in it will be of interest to inorganic and physical chemists alike. There are many equations given and prior knowledge of chemical processes and reactions is not assumed. The chapters on aqueous oxidation (Chapters 6 and 7) are particularly interesting and are well illustrated with many diagrams and tables. It is a pity the author does not discuss microbiological leaching of ores in

more detail, and the use of sulfur as an additive in the presence of *Thiobacillus Ferro-oxidans* is worthy of a mention, as this too is thought to accelerate the extraction of base metals. However, this is a minor point in an otherwise comprehensive treatment of the literature.

The sections on recovery are both significant and topical, as a shortfall in the production of both sulfur and copper is predicted in the 1980s. Throughout the book, the author is aware of environmental needs and safeguards, especially when referring to sulfur dioxide produced as a by-product in the roasting process. Pollution, it would appear, can be reduced using acid pressure leaching, where the sulfur dioxide is recovered as sulfur, and the toxic metals mercury and arsenic can be isolated. Engineering advantages for this method are also discussed in the final chapter and the author's case for the industry being directed towards pressure leaching is adequately illustrated. The subject index is well cross-referenced and comprehensive.

A good deal of work has obviously gone into this book and it should be found in all metallurgy and engineering libraries and will certainly benefit any chemist who wishes to learn more about the important field of chalcopyrite and its related ores.

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