

# Preface

The development of minerals processing over one hundred years has shown flotation a predominant process of materials separation. Nowadays, flotation is widely used in minerals separation, treatments of slag and wastes, materials separation, and valuables recovery in metallurgical, coal, and chemical engineering. Flotation reagents have played vital roles in the progress of flotation process. The development and application of the reagents have made it possible for more and more traditional refractory ores and materials to be treated by flotation process with high efficiency.

Several books on flotation principles and reagents have been published, however, for further improvement of current minerals processing performance and for the treatment and recovery of refractory and nontraditional mineral and energy resources, scientists need to develop new reagents and innovative processes.

The author of this book took up investigation of flotation reagents in the 1960s. The fundamentals and approaches of surface chemistry have been applied in the round to discuss the structure, performance of the reagents, and the interaction between the reagents and minerals, as well as to set up theoretical criteria for collector performance. Molecular orbit method incorporating with molecular design was used to have obtained quantum chemistry parameters, steric configuration, HOMO, and LUMO surface of various reagents. This book has summarized the results that the author has achieved on functional principle of flotation reagents in the last 50 years.

The Chinese edition of this book was published in 1982 and reprinted in 1994 by Metallurgical Industry Press. This English edition, on the basis of Chinese edition, has incorporated the new findings on the topic in particular the molecular design of reagents achieved by the author and his research group. This book is intended for worldwide university teachers, researchers, R&D engineers, and graduate students in minerals processing, extractive metallurgy, and resources utilization who wish to explore innovative reagents and technologies that lead to more energy efficient and environmentally sustainable solutions.

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