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ABSTRACT

This book is designed to be used in an introductory sophomore-level undergraduate course in chemical engineering, civil engineering, industrial engineering, chemistry, and/or industrial chemistry. Senior-level students in resource development, soil science, and geology might also find this book useful. In addition, it is our hope that even advanced mathematics-oriented high school seniors might find the material easy to master as well.

This book emphasizes concepts, definitions, chemical equations, and descriptions with which some chemical science professionals struggle. It stresses the importance of maintaining uniformly high standards in pure chemical science and manufacturing technology while still keeping in mind that procedures that might seem strange also yield results that prove effective.

KEYWORDS

cement chemistry, cement production, clinkerization, dry process, manufacturing, Portland cement, wet process

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Preface

This book deals with the chemistry of the principal silicate and aluminate cements used in building and civil engineering. Emphasis is placed throughout on the underlying science and manufacturing process but detail practical applications which are well covered in other works.

In order to help the readers understand the context in which this book has been drafted for chemical engineering, civil engineering, industrial chemistry, chemistry, soil science, and geology disciplines, the book represents a summary information collected from limited number of sources and written by the author's understanding the science behind cement chemistry and manufacturing. The information provided in this book is intended to be used as an input to the determinations of the principles of production and chemistry of cement in specific areas.

The rest of this section describes the type of information that is provided in each chapter of the book.

Chapters 1, 2, and 3 provide general information on cement production in the world, together with its marketing, classification, and type of cements, chemistry, and raw material, the formation of limestone, additives, and pozzolan materials in cement processing.

Chapters 4, 5, 6, and 7 describe in more detail the mining of raw materials and composition; clinkerization and production processes of cement including the advantages and disadvantages of the dry and wet production mechanisms with quality and economic aspect; its burnability.

Chapters 8, 9, 10, and 11 present the testing of the produced cement materials with certain parameters; hydration effects of Portland cement for the cement strength; different types of cement and storage mechanisms.

Chapter 12 describes the technical analysis of basic cement quality parameters with a detailed laboratory procedure.

It is therefore of the utmost importance that the information contained in this book is fully take into account the best available techniques that change over time. This book will be reviewed and updated as appropriate.

Tadele Assefa Aragaw
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