

CONTENTS

Section I. Introduction

History of Alumina Chemicals	3
World Production and Economics of Alumina Chemicals	7

Section II. Fundamental Properties of Alumina Chemicals

Nomenclature, Preparation, and Properties of Aluminum Oxides, Oxide Hydroxides, and Trihydroxides	13
Mechanical Properties of Alumina	23
Colloidal Properties of Alumina	41
Phase Equilibria of Alumina	49

Section III. Current Commercial Production Processes, Products, and Application

Production Processes, Properties, and Applications for Aluminum-Containing Hydroxides	75
Production Processes, Properties, and Applications for Activated and Catalytic Aluminas	93
Production Processes, Properties, and Applications for Calcined and High-Purity Aluminas	99
Production Processes, Properties, and Applications for Tabular Alumina Refractory Aggregates	109
Production Processes, Properties, and Applications for Calcium Aluminate Cements	171
Gallium	185
Analytical Procedures for Alumina Chemicals	191

Section IV. State of the Art Assessments in Applications Utilizing Alumina Chemicals

Alumina Chemicals as Additives for Paper, Dentrifices, Paints, Coatings, Rubbers, and Plastics with Emphasis on Fire-Retardant Products	195
Activated Alumina Desiccants	241
Selective Adsorption Processes	251
Water-Treatment Products and Processes	263
Claus Catalysts and Alumina Catalyst Materials and Their Application	273
Monolithic Catalyst Systems	283
Pelleted Catalyst Systems	289
Electrical Properties of Alumina Ceramics	293
Electronic Ceramics	299
Alumina Usage in Electric Power Generation and Storage	309
Alumina in Electrical Porcelain	315
Dinnerware Manufacture and Use in the United States	323
Advanced Ceramics Involving Alumina	329
Alumina as a Biomedical Material	337

Alumina in Coatings	341
Alumina as a Composite Material	353
Alumina in Glasses and Glass-Ceramics	365
Alumina Powder Production by Aerosol Processes	375
Refractory Ceramic Fiber	385
Fused Alumina-Pure and Alloyed-as an Abrasive and Refractory Material	393
High-Alumina Refractories for Steelmaking in Europe	427
High-Alumina Refractories for Iron-and Steelmaking in Japan	433
Use of High-Alumina Refractories in the U.S. Steel Industry	447
Petroleum and Petrochemical Applications for Refractories	471
Refractories Used for Aluminum Processing	489
The Use of Alumina in Refractories for Melting Glass	495
Refractories Used for Investment Casting of High-Temperature Alloys	511
Alumina in Monolithic Refractories	519
Space Vehicle Thermal Protection	525
Section V. Industrial Hygiene and Toxicology of Alumina Chemicals	
The Aluminas and Health	533
Section VI. Long-Range Future Technology-The Role of Alumina Chemicals	
The Future of Alumina Chemicals in Europe	547
Long Range Future Trends: The Role of Alumina Chemicals-The Japanese Viewpoint	549
The Future Role of Alumina in Ceramics Technology	551
Long-Range Technology-The Role of Alumina Chemicals as Seen from the Japanese Viewpoint	555
Present Situation and Future Technology of Alumina Chemicals in Japan	561
A View of the Future for Alumina Chemicals	569
Section VII. Glossary	
A Glossary of Terms Most Frequently Used in Alumina Technology	577
Contributors	601
Author Index	609
Subject Index	611