

TABLE OF CONTENTS

Carbon Dioxide Reduction Metallurgy

Preface	ix
Editors.....	xiii

Carbon Dioxide Reduction Metallurgy

Mechanisms

From the Manhattan Project to Global Warming: The Science and Technology of CO ₂ Mitigation.....	3
<i>Meyer Steinberg</i>	
Chemical Utilization of Sequestered Carbon Dioxide as a Booster of Hydrogen Economy	19
<i>Michael Moats, Jan Miller, and Włodzimierz Zmierczak</i>	
Novel, Synergistic Oxygen Supply Technology for Metals Processing.....	25
<i>Phillip Armstrong, John Gordon, and Charles Lewinsohn</i>	
CO ₂ Reduction by Dry Methane Reforming over Hexaluminates: A Promising Technology for Decreasing Global Warming in a Cost Effective Manner	29
<i>Maria Salazar-Villalpando, and Todd H. Gardner</i>	
A Proposal for a Reduction Method of Global Atmospheric CO ₂ : Isolation of Surplus CO ₂ from the Biosphere and Fix it to Form an Insoluble Mineral onto a Sea Bottom.....	35
<i>Katsuyoshi Tatenuma</i>	
CO ₂ Capture and Sequestration – Implications for the Metals Industry.....	45
<i>Mark Berkley, Jason Berzansky, David Clarry, and Jim Sarvinis</i>	

Ferrous Industry

UCLOS: The European Steel Industry's Effort to Find Breakthrough Technologies to Cut Its CO ₂ Emissions Significantly.....	59
Jean-Pierre Birat, and J. Borlée	
Recent Developments in Technology Management for Reduction of CO ₂ Emissions in Metal Industry in India	71
Malti Goel	
Impact on Greenhouse Gas Emissions of a Switch from Carbon to Hydrogen as the Principal Reducing Agent in Producing Metals	83
James Evans, and Brian R. Wildey	
Sequestration of Carbon Dioxide by Steelmaking Slag: Process Phenomena and Reactor Study	95
Von Richards, Charles Rawlins, Simon N. Lekakh, and Kent D. Peaslee	
Canadian Green Steel: Adopting Best Practices	107
Jon Feldman, Edmund Smith, Steve Gale, and David Clarry	
Reduction of Ti-V-Magnetite with Microwave	119
Chenguang Bai, Liangying Wen, and Feng Xia	

Electrolytic Methods

Electrochemical Reduction of Carbon Dioxide	129
Melvin Miles	
Soda Fuel Cycle Metallurgy - Choices For CO ₂ Reduction.....	135
Neale Neelameggham	
Electrocatalytic Reduction of CO ₂ to C ₂ H ₄ at a Gas/Solution/Metal Interface	147
Kotaro Ogura	
CO ₂ Free Electrochemical Process for Production of Light Metals Using Ionic Liquids as Electrolytes	161
Mingming Zhang, and Ramana Reddy	

Carbon Dioxide Recycling by High Temperature Co-Electrolysis and Hydrocarbon Synthesis	171
<i>Joseph Hartvigsen, S. Elangovan, Lyman Frost, Anthony Nickens, Carl Stoots, James O'Brien, and J. Stephen Herring</i>	
CO ₂ Reduction by Nanoscale Galvanic Couples.....	183
<i>Kanchan Mondal</i>	
Reduction of Carbon Dioxide to Formate in an Electrochemical Membrane Reactor in KHCO ₃ Buffer Solutions	187
<i>Kandasamy Subramanian, Govindarajan Gomathi, and Krishnasamy Asokan</i>	
Author Index.....	199
Subject Index	201