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Nota di contenuto	Cover; Title Page; Copyright; Contents; Preface; List of Abbreviations; Nomenclature List; Chapter 1 Introduction; 1.1 Definitions; 1.2 Gas Markets, Gas Applications and Feedstock; 1.3 Sizes; 1.4 Units; 1.5 Ambient Conditions; 1.6 Objective of This Book; 1.7 Example Problems; 1.7.1 Synthesis Gas Plant; 1.7.2 Natural Gas Treatment; 1.7.3 Natural Gas Treatment for LNG; 1.7.4 Flue Gas CO2 Capture from a CCGT Power Plant; 1.7.5 Flue Gas CO2 Capture from a Coal Based Power Plant; 1.7.6 CO2 Removal from Biogas; 1.7.7 CO2 Removal from Landfill Gas; 1.7.8 Summarising Plant Sizes Just Considered ReferencesChapter 2 Gas Treating in General; 2.1 Introduction; 2.2 Process Categories; 2.2.1 Absorption; 2.2.2 Adsorption; 2.2.3 Cryogenics; 2.2.4 LNG Trains; 2.2.5 Membranes; 2.3 Sulfur Removal; 2.3.1 Scavengers; 2.3.2 Adsorption; 2.3.3 Direct Oxidation-Liquid Redox Processes; 2.3.4 Claus Plants; 2.3.5 Novelties; 2.4 Absorption Process; References; Chapter 3 Rate of Mass Transfer; 3.1 Introduction; 3.2 The Rate Equation; 3.3 Co-absorption and/or Simultaneous Desorption; 3.4 Convection and Diffusion; 3.5 Heat Balance; 3.6 Axially along the Column; 3.7 Flowsheet Simulators

3.8 Rate versus Equilibrium Approaches Further Reading; Chapter 4 Chemistry in Acid Gas Treating; 4.1 Introduction; 4.2 "Chemistry"; 4.3 Acid Character of CO₂ and H₂S; 4.4 The H₂S Chemistry with any Alkanolamine; 4.5 Chemistry of CO₂ with Primary and Secondary Alkanolamines; 4.5.1 Zwitterion Mechanism; 4.5.2 Termolecular Mechanism of Crooks and Donnellan; 4.5.3 Australian Approach; 4.5.4 Older Representations; 4.6 The Chemistry of Tertiary Amines; 4.7 Chemistry of the Minor Sulfur Containing Gases; 4.7.1 The COS Chemistry; 4.7.2 Chemistry of CS₂; 4.7.3 Chemistry of Mercaptans (RSH)

4.8 Sterically Hindered Amines 4.9 Hot Carbonate Absorbent Systems; 4.10 Simultaneous Absorption of H₂S and CO₂; 4.11 Reaction Mechanisms and Activators-Final Words; 4.12 Review Questions, Problems and Challenges; References; Chapter 5 Physical Chemistry Topics; 5.1 Introduction; 5.2 Discussion of Solvents; 5.3 Acid-Base Considerations; 5.3.1 Arrhenius, Brønsted and Lewis; 5.3.2 Weak and Strong Acids and Bases; 5.3.3 pH; 5.3.4 Strength of Acids and Bases; 5.3.5 Titration; 5.3.6 Buffer Action in the NaOH or KOH Based CO₂ Absorbents; 5.4 The Amine-CO₂ Buffer System

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Sommario/riassunto

Gas Treating: Absorption Theory and Practice provides an introduction to the treatment of natural gas, synthesis gas and flue gas, addressing why it is necessary and the challenges involved. The book concentrates in particular on the absorption-desorption process and mass transfer coupled with chemical reaction. Following a general introduction to gas treatment, the chemistry of CO₂, H₂S and amine systems is described, and selected topics from physical chemistry with relevance to gas treating are presented. Thereafter the absorption process is discussed in detail, column hardware is explain