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Titolo	Extractive metallurgy . 1 Basic thermodynamics and kinetics [[electronic resource] /] / Alain Vignes
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Nota di contenuto	Cover; Extractive Metallurgy 1; Title Page; Copyright Page; Table of Contents; Preface; Chapter 1. Metallurgical Thermochemistry; 1.1. Introduction; 1.2. Quantities characterizing the state of a system and its evolution; 1.2.1. The types of operations; 1.2.2. Stoichiometric description of a chemical system; 1.2.3. Evolution of a system's state: degree of advancement of a reaction; 1.2.4. Characteristic quantities of a phase's composition; 1.3. Thermodynamic fundamentals of reactions; 1.3.1. Reaction enthalpy 1.3.2. Gibbs free energy of a system, affinity of a reaction and chemical potential of a component1.3.3. Expressions of the chemical potential and activities of a component; 1.3.4. Affinity of a reaction: law of mass action (thermodynamic modeling of a process); 1.3.5. Applications; 1.4. Phase diagrams; 1.4.1. Binary phase diagrams; 1.4.2. Ternary phase diagrams; 1.5. Bibliography; Chapter 2. Oxides, Sulfides, Chlorides and Carbides; 2.1. Introduction; 2.2. Metal-oxygen/metal-sulfur systems activities in the intermediate phases; 2.2.1. Phase diagrams

2.2.2. Component activities in the intermediate phases2.3. Standard Gibbs free energy: temperature diagrams for oxides - Ellingham-Richardson diagrams; 2.3.1. Stoichiometric oxides; 2.3.2. Unstoichiometric compounds; 2.3.3. Thermodynamic data for the reduction of oxides by a reducing gas; 2.4. Thermodynamic data for sulfides and chlorides; 2.4.1. Ellingham-Richardson diagram for sulfides; 2.4.2. Stability diagrams for the (M-O-S) systems; 2.4.3. Ellingham-Richardson diagram for chlorides; 2.4.4. Stability diagrams of M-O2-Cl2 systems
2.5. Metal-carbon phase diagrams and the Ellingham-Richardson diagram for carbides2.6. Carbon and carbon oxide reactions; 2.6.1. Oxidation reactions; 2.6.2. Boudouard's reaction; 2.6.3. The different types of coal; 2.7. Bibliography; Chapter 3. Metal Solutions, Slags and Mattes; 3.1. Introduction; 3.2. Metal solutions; 3.2.1. Phase diagrams and activities of liquid alloys components; 3.2.2. Activities and solubilities of metalloids in metal solutions; 3.2.3. Solubility and precipitation of oxide and sulfide compounds in metals; 3.3. Mattes 3.3.1. Structure and physical properties of sulfide melts (mattes)3.3.2. Thermodynamic data for the binary Fe-S, Ni-S, Cu-S and Pb-S systems; 3.3.3. Thermodynamic data of ternary mattes; 3.3.4. Thermodynamic data for M-O-S systems; 3.4. Slags; 3.4.1. Structure and physical properties; 3.4.2. Phase diagrams and activities; 3.4.3. Phase diagrams and activities of oxide mixtures forming the basis of metallurgical slags CaO-SiO2-Al2O3-MgO; 3.4.4. Phase diagrams and activities of mixtures of CaO-SiO2 -Al2O3-MgO oxides and reducible (iron, manganese and chrome) oxides; 3.5. Bibliography
Chapter 4. Aqueous Electrolytic Solutions and Salt Melts

Sommario/riassunto

This book is dedicated to the processes of mineral transformation, recycling and reclamation of metals, for the purpose of turning metals and alloys into a liquid state ready for pouring. Even though ""process metallurgy"" is one of the oldest technologies implemented by man, technological innovation, with the development of processes that are both focused on product quality and economically and ecologically efficient, continues to be at the heart of these industries. This book explains the physico-chemical bases of transformations, vital to their understanding and control (optimization of

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Autore	Kenny J. F (Joan F.)
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