1. Record Nr. UNINA9911004743303321

Autore	Zeebe Richard E
Titolo	CO in seawater : equilibrium, kinetics, isotopes / / Richard E. Zeebe and Dieter Wolf-Gladrow
Pubbl/distr/stampa	Amsterdam ; ; New York, : Elsevier, 2001
ISBN	1-281-05471-2 9786611054717 0-08-052922-4
Descrizione fisica	1 online resource (xiii, 346 pages) : illustrations
Collana	Elsevier oceanography series, , 0422-9894 ; ; 65
Altri autori (Persone)	Wolf-GladrowDieter A. <1953->
Disciplina	551.46/01
Soggetti	Seawater - Carbon dioxide content Chemical oceanography
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references (p. 313-340) and index.
Nota di contenuto	Cover; Contents; Chapter 1. Equilibrium; 1.1 The carbonate system; 1.2 Alkalinity; 1.3 pH scales; 1.4 Partial pressure and fugacity; 1.5 The Revelle factor; 1.6 Worked out problems; Chapter 2. Kinetics; 2.1 Basic concepts of kinetics; 2.2 Temperature dependence of rate constants; 2.3 Reactions and rate constants of the carbonate system; 2.4 Approaching equilibrium: the carbonate system; 2.5 Approaching isotopic equilibrium: 12C, 13C, and 14C; 2.6 Diffusion and Reaction; 2.7 Summary; Chapter 3. Stable Isotope Fractionation; 3.1 Notation, abundances, standards; 3.2 Carbon; 3.3 Oxygen; 3.4 Boron 3.5 Thermodynamic properties of isotopic substances; Appendix A: Equilibrium constants; A.1 CO2: Acidity constants K1* and K2*; A.2 Acidity constant of true carbonic acid; A.3 CO2 solubility in water (Henry's law); A.4 Ion product of water: KW*; A.5 Bisulfate ion; A.6 Hydrogen fluoride; A.7 Boric acid; A.8 Phosphoric acid; A.9 Silicic acid; A.10 Solubility product of calcite and aragonite; A.11 Effect of pressure on equilibrium constants; A.12 Chemical composition of seawater; A.13 The equation of state of seawater; Appendix B: From two to six; Appendix C: Details and Calculations C.1 Total alkalinity and charge balance; C.2 Saturation vapor pressure of water; C.3 The fugacity of a pure gas; C.4 Equilibrium at air-sea interface and chemical potential; C.5 Change CO2 concentration while

keeping pH constant; C.6 The rate constant for the hydroxylation of CO2, k+4; C.7 A formula for the equilibration time of CO2; C.8 Kinetic rate laws of the carbonate system; C.9 Derivation of oxygen isotope partitioning; C.10 Mathematical derivation of the partition function ratio; Appendix D: Answers to Exercises; Appendix E: Notation and Symbols; References; Index

Sommario/riassunto

Carbon dioxide is the most important greenhouse gas after water vapor in the atmosphere of the earth. More than 98% of the carbon of the atmosphere-ocean system is stored in the oceans as dissolved inorganic carbon. The key for understanding critical processes of the marine carbon cycle is a sound knowledge of the seawater carbonate chemistry, including equilibrium and nonequilibrium properties as well as stable isotope fractionation. Presenting the first coherent text describing equilibrium and nonequilibrium properties and stable isotope fractionation among the elements