

1. Record Nr.	UNINA9910819988403321
Autore	Privalov Peter L
Titolo	Microcalorimetry of macromolecules : the physical basis of biological structures / / Peter L. Privalov
Pubbl/distr/stampa	Hoboken, N.J., : Wiley, 2012
ISBN	9786613662453 9781280685514 1280685514 9781118337493 1118337492 9781118337509 1118337506 9781118337479 1118337476
Edizione	[1st ed.]
Descrizione fisica	1 online resource (422 p.)
Collana	Wiley series in protein and peptide science Microcalorimetry of macromolecules
Classificazione	SCI007000
Disciplina	547/.7
Soggetti	Macromolecules Macromolecules - Analysis Calorimeters
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	MICROCALORIMETRY OF MACROMOLECULES; CONTENTS; 1: INTRODUCTION; 2: METHODOLOGY; 2.1. THERMODYNAMIC BASICS OF CALORIMETRY; 2.1.1. Energy; 2.1.2. Enthalpy; 2.1.3. Temperature; 2.1.4. Energy Units; 2.1.5. Heat Capacity; 2.1.6. Kirchhoff's Relation; 2.1.7. Entropy; 2.1.8. Gibbs Free Energy; 2.2. EQUILIBRIUM ANALYSIS; 2.2.1. Two-State Transition; 2.2.2. Derivatives of the Equilibrium Constant; 2.3. AQUEOUS SOLUTIONS; 2.3.1. Specificity of Water as a Solvent; 2.3.2. Acid-Base Equilibrium; 2.3.3. Partial Quantities; 2.4. TRANSFER OF SOLUTES INTO THE AQUEOUS PHASE; 2.4.1. Hydration Effects 2.4.2. Hydrophobic Force2.4.3. Hydration of Polar and Nonpolar Groups; REFERENCES; 3: CALORIMETRY; 3.1. ISOTHERMAL REACTION

MICROCALORIMETRY; 3.1.1. The Heat of Mixing Reaction; 3.1.2. Mixing of Reagents in Comparable Volumes; 3.1.3. Isothermal Titration Microcalorimeter; 3.1.4. ITC Experiments; 3.1.5. Analysis of the ITC Data; 3.2. HEAT CAPACITY CALORIMETRY; 3.2.1. Technical Problems; 3.2.2. Differential Scanning Microcalorimeter; 3.2.3. Determination of the Partial Heat Capacity of Solute Molecules; 3.2.4. DSC Experiments 3.2.5. Determination of the Enthalpy of a Temperature-Induced Process 3.2.6. Determination of the van't Hoff Enthalpy; 3.2.7. Multimolecular Two-State Transition; 3.2.8. Analysis of the Complex Heat Capacity Profile; 3.2.9. Correction for Components Refolding; 3.3. PRESSURE PERTURBATION CALORIMETRY; 3.3.1. Heat Effect of Changing Pressure; 3.3.2. Pressure Perturbation Experiment; REFERENCES; 4: MACROMOLECULES; 4.1. EVOLUTION OF THE CONCEPT; 4.2. PROTEINS; 4.2.1. Chemical Structure; 4.2.2. Physical Structure; 4.2.3. Restrictions on the Conformation of Polypeptide Chains 4.2.4. Regular Conformations of Polypeptide Chain Proteins 4.3. HIERARCHY IN PROTEIN STRUCTURE; 4.3.1. Tertiary Structure of Proteins; 4.3.2. Quaternary Structure of Proteins; 4.4. NUCLEIC ACIDS; 4.4.1. Chemical Structure; 4.4.2. Physical Structure; REFERENCES; 5: THE -HELIX AND -HELICAL COILED-COIL; 5.1. THE -HELIX; 5.1.1. Calorimetric Studies of -Helix Unfolding-Refolding; 5.1.2. Analysis of the Heat Capacity Function; 5.2. -HELICAL COILED-COILS; 5.2.1. Two-Stranded Coiled-Coils; 5.2.2. Three-Stranded Coiled-Coils; 5.3. -HELICAL COILED-COIL PROTEINS; 5.3.1. Muscle Proteins 5.3.2. Myosin Rod 5.3.3. Paramyosin; 5.3.4. Tropomyosin; 5.3.5. Leucine Zipper; 5.3.6. Discreteness of the Coiled-Coils; REFERENCES; 6: POLYPROLINE-II COILED-COILS; 6.1. COLLAGENS; 6.1.1. Collagen Superhelix; 6.1.2. Hydrogen Bonds in Collagen; 6.1.3. Stability of Collagens; 6.1.4. Role of Pyrrolidine Rings in Collagen Stabilization; 6.2. CALORIMETRIC STUDIES OF COLLAGENS; 6.2.1. Enthalpy and Entropy of Collagen Melting; 6.2.2. Correlation between Thermodynamic and Structural Characteristics of Collagens; 6.2.3. Role of Water in Maintaining the Collagen Structure 6.3. THERMODYNAMICS OF COLLAGENS

Sommario/riassunto

"This is the first textbook on the microcalorimetry of biological molecules. The coverage starts from the basics of thermodynamics (which are unknown for many scientists working in biology), describes evolution of the calorimetric technique, explains how to analyze the calorimetric data, and illustrates these methods with a wide selection of examples. The book provides an essential resource to scientists studying biological molecular structures and the reactions between these structures"--