

NAVIGATE THE COMPLEXITIES OF BIOCHEMICAL THERMODYNAMICS WITH MATHEMATICA®

Chemical reactions are studied under the constraints of constant temperature and constant pressure; biochemical reactions are studied under the additional constraints of pH and, perhaps, pMg or free concentrations of other metal ions. As more intensive variables are specified, more thermodynamic properties of a system are defined, and the equations that represent thermodynamic properties as a function of independent variables become more complicated.

This sequel to Robert Alberty's popular *Thermodynamics of Biochemical Reactions* describes how researchers will find Mathematica® a simple and elegant tool, which makes it possible to perform complex calculations that would previously have been impractical. *Biochemical Thermodynamics: Applications of Mathematica®* provides a comprehensive and rigorous treatment of biochemical thermodynamics using Mathematica® to practically resolve thermodynamic issues.

Topics covered include:

- Thermodynamics of the dissociation of weak acids
- Apparent equilibrium constants
- Biochemical reactions at specified temperatures and various pHs
- Uses of matrices in biochemical thermodynamics
- Oxidoreductase, transferase, hydrolase, and lyase reactions
- Reactions at 298.15K
- Thermodynamics of the binding of ligands by proteins
- Calorimetry of biochemical reactions

Because Mathematica® allows the intermingling of text and calculations, this book has been written in Mathematica® and includes a CD-ROM containing the entire book along with macros that help scientists and engineers solve their particular problems.

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