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## Acid-Base Diagrams



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Heike Kahlert • Fritz Scholz

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Heike Kahlert  
Fritz Scholz  
Institute of Biochemistry  
University of Greifswald  
Greifswald  
Germany

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*This book is dedicated to Prof. Dr. Günter Henrion on the occasion of his 80th birthday. It is an expression of esteem for an inspirational teacher, who first sparked our love of pH-log<sub>i</sub> diagrams during our chemistry studies at Humboldt University, Berlin.*

Heike Kahlert and Fritz Scholz



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## Preface

The understanding of acid–base equilibria is of basic importance for chemistry, and thus also for biochemistry, biology, environmental sciences, etc. Hardly any chemical technique, any biochemical process, any environmental phenomenon can be understood without a profound knowledge of the underlying acid–base equilibria on a quantitative basis. However, even for the simplest chemical systems the mathematical calculations can be rather complicated, and the desire will arise to describe the systems by well-chosen approximations. For all these requirements there is one powerful means, the so-called acid–base diagrams ( $\text{pH}\text{-log}c_i$  diagrams), which permit a simple presentation of the dependencies of the concentrations of all participating species as a function of  $\text{pH}$  of the aqueous solutions. With their help, it is easy to find the possible simplified equation which permits a straightforward calculation of special cases. These diagrams also permit the construction of titration diagrams. The present book is the result of the many years of teaching experience of the authors, during which they have learned what the usual problems of understanding are which students have in using these diagrams. The book has been written because there was no other textbook which presented the fundamentals and applications of  $\text{pH}\text{-log}c_i$  diagrams in the necessary depth *and* with the desired simplicity. It was not the goal to describe these diagrams comprehensively with all imaginable special cases, but the authors had the aim of giving clear and straightforward instruction on how to construct and use these tools for problem-solving. We hope that this book will guide students of chemistry, biochemistry, biotechnology, biology, pharmacy, physics, environmental sciences, geosciences, hydrology, medicine, etc. in their attempts to handle acid–base equilibria.

Greifswald  
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Heike Kahlert  
Fritz Scholz



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# Contents

<b>1 Introduction</b> .....	1
Literature .....	2
<b>2 The Math Behind the pH-log<sub>c<sub>i</sub></sub> Diagrams</b> .....	5
Literature .....	18
<b>3 Constructing pH-log<sub>c<sub>i</sub></sub> Diagrams</b> .....	19
3.1 Monobasic Acids .....	19
3.2 Dibasic Acids .....	22
3.3 Tribasic Acids .....	25
3.4 Tetrabasic Acids .....	29
<b>4 The Application of pH-log<sub>c<sub>i</sub></sub> Diagrams for Graphical Estimation of the pH of Solutions and for the Derivation of Useful Simplified Equations</b> .....	33
4.1 Monobasic Acids and Their Corresponding Bases .....	36
4.1.1 Very Strong Acids and Their Corresponding Very Weak Bases .....	36
4.1.2 Strong Acids and Their Corresponding Weak Bases .....	40
4.1.3 Weak Acids and Their Corresponding Strong Bases .....	46
4.1.4 Very Weak Acids and Their Corresponding Very Strong Bases .....	51
4.1.5 Ranges of Validity of the Simplified Equations for Monobasic Acids .....	55
4.2 Dibasic Acids, Ampholytes, and Diacidic Bases .....	56
4.2.1 Dibasic Acids .....	56
4.2.2 Simplified Equation for Ampholytes .....	62
4.2.3 Diacidic Bases .....	68
4.3 Salt Solutions with Protolyzing Anions and Cations .....	72
4.4 Examples .....	76
4.4.1 The pH-log <sub>c<sub>i</sub></sub> Diagram of Water .....	76
4.4.2 Acetic Acid/Acetate .....	77
4.4.3 Hydrogen Sulfide .....	78

4.4.4	Phosphoric Acid	79
4.4.5	Ascorbic Acid	80
4.4.6	Acetylsalicylic Acid	81
4.4.7	Benzoic Acid	83
4.4.8	Glycine	84
4.4.9	Aspartic Acid	85
4.4.10	Ethylenediaminetetraacetic Acid (EDTA)	86
	Literature	88
<b>5</b>	<b>The Use of pH-log<math>c_i</math> Diagrams for the Construction of Titration Diagrams</b>	<b>89</b>
5.1	Titration of Hydrochloric Acid of Various Concentrations with Sodium Hydroxide Solution	91
5.2	Titration of Sodium Hydroxide Solution with Hydrochloric Acid	93
5.3	Titration of Different Concentrations of Acetic Acid with Sodium Hydroxide	94
5.4	Titration of Moderately Strong Acids Having Different $pK_a$ Values with Sodium Hydroxide	96
5.5	Titration of Sulfuric Acid	98
5.6	Titration of Dibasic Amino Acids	99
5.7	Comparison of the Titrations of an Acid and its Corresponding Base: (a) Ammonium Ions with Sodium Hydroxide, (b) Ammonia with Hydrochloric Acid	100
<b>6</b>	<b>Titration Errors</b>	<b>103</b>
6.1	Systematic Titration Errors	103
6.1.1	Systematic Titration Errors in Titrations of Acids with $pK_a$ Values Between 0 and 14 with Very Strong Bases (e.g., NaOH)	104
6.1.2	Systematic Titration Errors of Titrations of Bases with $pK_b$ Values Between 0 and 14 with a Very Strong Acid (e.g., Hydrochloric Acid)	106
6.1.3	Systematic Titration Errors of Titrations of Very Strong Acids with Very Strong Bases and Vice Versa	108
6.2	Random Titration Errors	110
	Literature	111
	<b>Appendix A: Derivation of the Exact Functions and the Equations of the Asymptotes for Multibasic Acids</b>	<b>113</b>
	<b>Index</b>	<b>135</b>