

Preface

*The latest authors, like the most ancient,
strove to subordinate the phenomena
of nature to the laws of mathematics*

Isaac Newton, 1647–1727

The approach quoted above has been adopted and practiced by many teachers of chemistry. Today, physical chemistry textbooks are written for science and engineering majors who possess an *interest in* and *aptitude for mathematics*. No knowledge of chemistry or biology (not to mention poetry) is required. To me this sounds like a well-defined prescription for limiting the readership to a *few and carefully selected*.

I think the importance of physical chemistry goes beyond this precept. The subject should benefit both the science and engineering majors and those of us who dare to ask questions about the world around us. Numerical mathematics, or a way of thinking in mathematical formulas and numbers – which we all practice, when paying in cash or doing our tax forms – is important but should not be used to *subordinate* the infinitely rich world of physical chemistry.

With this in mind, I present you a collection of problems and questions in physical chemistry, along with detailed solutions, answers, and explanations of basic ideas. Given my personal interest I tried to focus the book on the puzzles from the living world. My first goal is to guide you through a solution of a problem. If, after some practice, you start understanding conventions, assumptions, and approximations that make physical chemistry, I will have accomplished my goal. Perhaps you will then start understanding that a physical chemist is *not* someone who “uses mathematics to subordinate the phenomena of nature” but rather an artist skilled at finding and using assumptions and approximations that lead toward a solution of a physical chemical problem. If you also pick up some relations, laws, rules, and a couple of mathematical tricks along the way I will be tempted to cry – “Now I have created a monster – s/he has become a physical chemist!” Or, perhaps I should

feel good at that point, knowing that your new knowledge and skills will point to you many doors and paths you never knew existed. It will also help you sail easier through many jobs, training programs, career changes, and other tasks you will be engaged in through your life. Read this book and study physical chemistry – for it is one of the best investments you can make in your life.

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