



Molecular Crystals and Liquid Crystals

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Book Review

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BOOK REVIEW

How to Use Excel in Analytical Chemistry and in General Scientific Data Analysis by Robert de Levie, Cambridge University Press, 2001; ISBN 0-521-64282-5 (hardback); 0-521-64484-4 (paperback); \$120.00 (hardback); \$44.95 (paperback).

The book by de Levie on data analysis with Excel is both timely and thorough. Excel has become the *de facto* standard for spreadsheets, commanding a huge market share, and any scientist that works with significant quantities of numerical data should have some level of familiarity with this program or spreadsheets in general. Robert de Levie carefully and accurately guides the reader through discussions and copious Excel exercises that increase in complexity and introduce new topics at every turn. Completing the entire book and conducting all the exercises is an arduous task, and the excitement of even the most ambitious scientist will likely fade somewhere through the book's 487 pages.

The use of spreadsheets in analytical chemistry at the undergraduate level has a relatively long history, developing not long after the introduction of the modern computer spreadsheet. A quick perusal of my bookshelf netted three analytical textbooks that make significant use of spreadsheets in discussing quantitative chemical analysis. These include *Analytical Chemistry: An Introduction*, 7th edition, by Skoog et al. (2000), *Quantitative Chemical Analysis*, 5th edition, by Harris (1999) (Harris' use of spreadsheets goes back to his 4th edition published in 1995), and of course *Principles of Quantitative Chemical Analysis* by de Levie (1997).

How to Use Excel in Analytical Chemistry and in General Scientific Data Analysis goes far beyond the texts mentioned above and is really the complete guide for analytical chemists (or other scientists) who want to learn to use spreadsheets in their field of study. The book is also quite suitable, even tailored, as a supplemental text for use in undergraduate analytical chemistry, although it may be more useful in an advanced undergraduate or graduate course.

Material is presented in a logical stepwise approach guiding even the complete beginner through the use of increasingly complex calculations, simulations, and graphs. My own experience with spreadsheets was somewhat limited and I had rarely used Excel before reading this book.

I had no problems progressing through the text and following along with all the exercises. There are even special instructions for those with older versions of Excel (e.g., Excel 5 or Excel 95).

For someone familiar with the typical layout of undergraduate analytical chemistry textbooks, de Levie's book is the perfect companion. The book's ten chapters are divided into six parts that are arranged in a logical fashion. Starting out with a very basic introduction to the use of Excel spreadsheets (Part I, Chapter 1), it quickly progresses to exercises that cover the common statistical tools used by analytical chemists and many scientists (Part II, Chapters 2 & 3). Some of my students taking Analytical Chemistry I (Quantitative Analysis) opted to get extra credit by conducting these exercises as homework assignments. Part III of the book, which includes Chapters 4 and 5, provides extensive coverage of ionic equilibria calculations and graphing with emphasis on acid base problems but also contains sufficient coverage of complexation and solubility problems as well. Part IV (Chapter 6) includes exercises on spectroscopy, chromatography, and voltammetry that are again ideal for advanced undergraduate or graduate study in analytical chemistry. Part V includes Chapter 7 on Fourier transform (which I found quite challenging), Chapter 8 on "Standard Mathematical Operations" (largely graduate level material), and Chapter 9 on "Numerical Simulation of Chemical Kinetics" (where I really lost interest). The final section of the book, Part VI includes only Chapter 10 with some very useful macros that the reader can basically pick and choose from.

Overall I found this book to be thorough, useful, and timely in its treatment and coverage of spreadsheets in analytical chemistry. Its accuracy was simply amazing to me because, even though you would expect all of the commands and exercises in a book like this to be accurate, you would also expect mistakes to creep in. I can't remember more than two times that I could not get a sequence of commands to work the way it was given in the text, and for all I know it may have been my error. Robert de Levie has done an excellent job of preparing a text that caters to the beginner while providing enough complexity to be useful to the seasoned analytical chemist looking to develop advanced spreadsheet skills and applications.

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