

## Book Review

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**Environmental laboratory exercises for instrumental analysis and environmental chemistry**

Wiley-Interscience, 2004,  
416 pp; price £43.50  
ISBN 0-471-48856-9 (paperback)

This experimental manual is described as a 'comprehensive set of real-world environmental laboratory experiments integrating air, soil and water analysis into one laboratory manual'. It certainly fulfils this objective in many respects and is a very useful text for the practical aspects of any undergraduate course in environmental or analytical chemistry. Organized into seven parts, each comprising a number of chapters, it describes 19 different practical experiments. There are also six 'fate and transport calculations', each of which entails an assignment based on software supplied on the CD that accompanies the book.

Part one of the book is a general introduction, which covers the importance of maintaining a laboratory book, some statistics and the equipment for field sampling in different locations. Whilst some aspects of this part of the book are very good, the chapter on statistics does not cover this subject in much detail or emphasize the breadth of the area. In particular, the author has not provided any solid references to consolidate the areas that have been included. However, the book is clearly not targeted at this particular audience so this shortcoming can be forgiven; suffice to say that a future

edition would be more useful with a summary of a range of statistical methods, particularly multivariate methods that are widely applied in the environmental sciences.

The next four parts of the book detail experiments for various environmental spheres, starting with experiments related to air samples, water samples, hazardous waste and finally sediment and soil samples. A total of 14 practical exercises are detailed which span a range of analytical techniques, including: UV-visible and infrared spectroscopy; chemical specific electrodes; atomic absorption and emission spectroscopy; and high-performance liquid, gas and ion chromatographies. As such it deals with the majority of laboratory techniques that any graduate student might possibly encounter when embarking on a career in environmental or analytical chemistry, and also the analytical methods covered in most undergraduate university courses in the environmental, chemical and/or physical sciences. Part 6 of the book details the wet chemical experiments that form the core of most environmental courses, including the determination of dissolved oxygen by the Winkler method, the determination of BOD, measurement of alkalinity and the determination of water hardness.

The final part of the book details a number of chemical fate models for pollutants in different environmental systems such as rivers and streams, lake systems, groundwater systems and the atmosphere. After an in-depth description of the theory behind each model or calculation, including its mathematical basis and

a derivation of the equations underpinning it, the associated assignments use software supplied on an accompanying CD-ROM to further explore the use of modelling in an environmental context.

On the whole this is a most useful book to base the experimental aspects of an undergraduate environmental course on. It is essentially self-contained in the sense that each practical includes an explanation of the environmental science behind the requirement to measure that particular pollutant or physical parameter, describes what and how to carry out the experiment, provides pages to record the experimental data acquired, and then provides a useful set of problems and questions that students can use as a framework for their practical write-up. The book does not, however, detail experimentation based on sufficiently advanced instrumentation (e.g. inorganic or organic mass spectrometry) to describe it as suitable for advanced or postgraduate courses. A few minor negative points relating to the use of non-SI units in places and the inclusion of practical exercises based on GC with ECD detection, which is not commonly available and is somewhat problematic detection method, do not really detract from the overall usefulness of the text as a whole. All-in-all a useful addition to the literature for undergraduate studies involving practical work in environmental chemistry.

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