Handbook of Radioactivity Analysis; edited by Michael F. L'Annunziata, 3rd ed., Academic Press: San Diego, **2012**, hardcover, 1379 pp., € 230.05, ISBN: 978-0-12-384873-4

This mighty hardback of almost 1400 US letter-sized pages is the third edition of this handbook to appear, 24 years after the first edition. It has been enlarged by 7 chapters over its predecessor – now a total of 21 – and all the other chapters have been updated in what has surely become one of the standard reference works for those working in both academia and industry in detection, measurement and analysis in the area of radioactivity.

After the obligatory introductory chapters on the physics of radiation and decay and aspects of statistical analysis, the first third of the book contains details of the various types of detectors and procedures available and covers the whole range of gas ionization detectors, solid-state nuclear track detectors, semiconductor detectors and alpha spectrometry. The content then moves on to a consideration of all aspects of liquid scintillation analysis, commencing with the principles and practice and continuing with descriptions of sample preparation methodology for liquid scintillation analysis in biological samples (some of the protocol descriptions are not for the faint-hearted) and environmental samples, including aerosols and marine samples. This is followed by chapters on mass spectrometric detection of radionuclides, radionuclide standardization and Cherenkov counting. Chapters on solid and flow-cell scintillation analysis and automated separation and analysis lead into the final section of the book which has chapters on high-resolution beta imaging, analytical techniques for nuclear safeguards and nuclear forensics. Each chapter concludes with an extensive list of references to the primary literature. The book is completed with a table of radioactive isotopes, an appendix of particle range–energy correlations and an extensive index that will be invaluable in deconvoluting the contents of this extensive and far-ranging text.

Most chapters are multi-author produced and this accounts for some inconsistencies in style of writing and variation in the quality of photographs and diagrams, many of which would have been enhanced if colour had been used. However, as this book will be mostly used as a reference work, not as light reading, the inconsistencies between chapters are not intrusive.

A review of the book promotes it as a teaching aid but it must be an obligatory reference work for engineers and physicists on any site where analysis of radioactive materials in any form is taking place; although I guess its price will deter many from buying a personal copy. As for chemists? Well, any analytical chemist working within the nuclear industry will find the chapters dealing with sample preparation invaluable and the rest of the book a useful reference work for the odd snippet of information, but synthetic organic chemists have few opportunities in this domain – as someone who prepares potential transuranic selective ligands for use in partitioning, this reviewer is one of the few who carry out organic synthesis for the nuclear sector.

In conclusion, this will be an important reference work for those chemists carrying out analysis within a nuclear context, but synthetic organic chemists will not be rushing out in droves to buy a copy; although it would be good to know that a copy was present in one's institution's library.

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