

BOOK REVIEW

ISOTOPES: ESSENTIAL CHEMISTRY AND APPLICATIONS II

Edited by J R Jones

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This second volume in the series consists of papers presented at a Residential School organised by The Royal Society of Chemistry in conjunction with the University of Surrey in January 1988. It follows the publication format of Volume I in 1980. Although the introduction states that the emphasis is on short-lived radioisotopes such as  $^{11}\text{C}$ ,  $^{13}\text{N}$ ,  $^{18}\text{F}$  and  $^{125}\text{I}$  (not  $^{125}\text{F}$ !), in fact only 21 percent of the total text relates to these isotopes. The remainder provides useful reviews of the analysis of isotopically labelled compounds, uses of isotopes in medicine and isotopic labelling methods in molecular biology and industry.

The first of the 10 sections of the text describes the syntheses and applications, especially for positron emission transaxial tomography (PETT), of the short-lived positron emitters ( $^{11}\text{C}$ ,  $^{13}\text{N}$  and  $^{18}\text{F}$ ). Section 2 provides an excellent review of radioiodination techniques particularly for labelling peptides and proteins together with methods for their subsequent purification. Highlighted also are developments in the use of high performance liquid chromatography (HPLC) for separating various iodinated species of the labelled peptides.

In section 3 the various methods used in radiochromatography (paper, thin-layer plate, HPLC, and radio-gas) of labelled compounds including an up-to-date review of measurement methods and isotope effects in chromatography. Section 4 discusses modern spectroscopic methods for the analysis of labelled compounds with emphasis on NMR spectroscopic techniques for protons, deuterons, tritons and carbon-13, followed by a discussion of mass spectrometry, infra-red and ultra-violet light spectroscopy. Section 6 should have followed as this deals with isotopic shifts in NMR spectrometry and applications with particular emphasis on carbon-13 measurements and H/D isotope effects.

A good review of the current practice of autoradiography for the localisation and quantitation of radioactivity in solid specimens using nuclear emulsions and various films is given in Section 5 which also has a

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useful Appendix defining terms used in autoradiography for those less familiar with the subject.

A review of sample preparation and instrumentation using stable isotopes ( $^{13}\text{C}$ ,  $^{15}\text{N}$ ,  $^{18}\text{O}$  and  $^{34}\text{S}$ ) is provided in Section 7 together with some examples of models for their use in clinical studies and measurement in breath. Section 8 gives an up-to-date view of radioisotopes in nuclear medicine and the uses of modern radiopharmaceuticals as diagnostic imaging agents. Also reviewed in this Section is the potential use as imaging agents of labelled monoclonal antibodies as well as a short discussion of PETT. Important aspects of safety in use and quality assurance for radiopharmaceuticals are also highlighted.

The final two Sections cover respectively some labelling techniques in molecular biology, not out of place in view of the growing interest in the uses of DNA probes for diagnosis, and the industrial applications of radioisotopes fitting perhaps less appropriately for a text which is focussed mainly on applications in medicine.

Overall this is a well produced text covering a wide range of material of interest to anyone using or planning to use isotopically labelled compounds as tools for scientific research or in diagnostic medicine. Good value for the price and complementary to the first Volume.

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