

FOREWORD

The use of radioactive and enriched stable isotopes as tracers is today widespread both in the physical and the biological sciences. In the early days of use, it was always assumed that for all practical purposes the tracer atoms behaved identically with the other atoms of the elements in question. With refinements in techniques obtained in recent years it is known that this is not necessarily so. The difference in weight may cause a considerable effect on the chemical behaviour. This is very obvious in the case of deuterium and tritium, which today are widely used, but it also applies to many other common tracers, such as carbon-13 and -14, nitrogen-15, oxygen-17 and -18, and others. On a purely practical basis, such differences must therefore always be recognized.

On the other hand, a vigorous development of the theoretical treatment of chemical reaction kinetics has shown that unique fundamental information on molecular structure and reaction mechanisms can be obtained from these differences. In such a situation where theoreticians and a wide variety of experimentalists are all advancing rapidly, the International Atomic Energy Agency and the Joint Commission on Applied Radioactivity (ICRU) felt it timely and appropriate to arrange a Symposium on Isotope Mass Effects in Chemistry and Biology, where the various categories of researchers could exchange their views. The correctness of this feeling was, indeed proved by the very lively discussions which followed each of the 29 papers.

This volume contains the full text of the papers presented during the Symposium, together with a selection of the comments made by the participants.