Modern Magnetic Resonance

Graham A. Webb
Editor

Modern Magnetic Resonance

Second Edition

With 742 Figures and 84 Tables

Springer

Editor
Graham A. Webb
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Preface to the Second Edition

It is now 12 years since the first edition of the handbook of *Modern Magnetic Resonance* (MMRl) appeared. During this time there have been significant advances both in the techniques employed in magnetic resonance studies and in their areas of application. The purpose of MMR2 is to chart this progress in both application and available experimental methods.

Developments in nuclear magnetic resonance spectroscopy (NMR), magnetic resonance imaging (MRI), and electron spin resonance (ESR) are included in MMR2. As in MMRl, progress in the fields of Biological Sciences, Chemistry, Food Science, Marine Science, Materials Science, and Pharmaceutical Sciences are covered in MMR2. In addition, a section is included on magnetic resonance applications in Archaeology.

It is a pleasure for me to express my gratitude to the Section Editors, and their contributors, for their determination and dedication to the production of MMR2.

Royal Society of Chemistry
London, UK

Graham A. Webb
April 15th 2018

Preface to the First Edition

It is a great pleasure for me to Introduce the handbook of Modern Magnetic Resonance, MMR. The various techniques which comprise MMR derive essentially from three sources, all of which were produced by physicists. Today they are widely used by scientists working in many diverse areas such as chemistry, biology, materials, food, medicine and healthcare, pharmacy and marine studies.

The first source of MMR studies is nuclear magnetic resonance, NMR. This provides details on the relative positions of nuclei, i.e. atoms, in a molecule. Consequently NMR provides structural information on samples which may be in the solid, liquid or gaseous state. Nuclear relaxation data yield dynamic information on the sample and the topology of the dynamic processes if the sample is undergoing a molecular change. Thus high and low resolution NMR studies provide information on all interesting aspects of molecular science. The protean nature of NMR is reflected in its many applications in chemistry, biology and physics which explore and characterize chemical reactions, molecular conformations, biochemical pathways and solid state materials, to name a few examples.

Magnetic resonance imaging, MRI, is the second source of MMR data. MRI provides a three-dimensional image of a substance, and is consequently widely employed to assess materials both in vitro and in vivo. The importance of MRI studies in many areas of science and medicine is shown by the recent award of the Nobel Prize to Lauterbur and Mansfield.

The third source of MMR results is due to electron spin resonance, ESR. This is a technique for detecting unpaired electrons and their interactions with nuclear spins in a given sample. Thus ESR data are often used to complement the results of NMR experiments.

Taken together NMR, MRI and ESR comprise the field of MMR, recent years have witnessed the fecundity of these techniques in many scientific areas. The present three volumes cover applications in most of these areas. Part 1 deals with Chemical Applications, Biological and Marine Sciences. Medical and Pharmaceutical Sciences are covered in Part 2. Part 3 provides examples of recent work in the Materials Science and Food Science.

I wish to express my gratitude to all of the Section Editors and their many contributors for their hard work and dedication in the creation of MMR. My thanks

also go to Emma Roberts and the production staff at Springer, London, for their assistance in the realization of these volumes.

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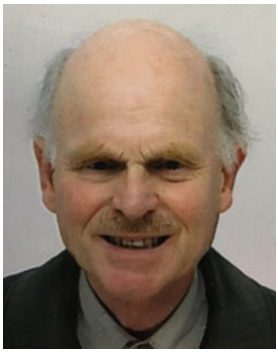
February 2005

Editor Biography



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Approximately 400 papers in various scientific journals, most of them on NMR related topics.

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