

# Preface

There is an enormous world-wide effort in basic scientific research as well as in industrial development in the area of organic electronics. It is becoming increasingly clear that if devices based on organic materials are ever going to have a significant relevance beyond being a cheap replacement for inorganic semiconductors, one will need to understand interface formation, film growth, and functionality. Control of these aspects will allow the realisation of totally new device concepts exploiting the enormous flexibility inherent in organic chemistry. In the field of device-relevant semiconducting organic materials one finds many parallels with that of inorganic semiconductors. However, the versatility of organic molecules comes at the cost of higher materials complexity. This rules out the simple transfer of concepts established from inorganic semiconductor research, and makes work on organic semiconductors particularly challenging.

World-wide, investigations into organic thin films can be partitioned into three areas of focus with different aims and a mix of applied versus basic research: (1) the development and production of devices, (2) thin film characterisation, and, more recently, with the recognition of the importance of molecular level control (3) surface and interface science. As shown in this volume, linking these branches creates enormous synergies leading to a significant advance in the field of organic semiconductors.

In this review we focus on oligomeric/molecular films, as we believe that the control of molecular structures and interfaces provides highly defined systems which allows, on the one hand, the study of the basic physics and, on the other hand, to find the important parameters necessary to improve organic devices.

Even the simplest organic devices have a number of constituents whose morphology, order, and interfaces have a major influence on their properties. This book is conceived to report on the activities of the leading groups in Austria and their international collaborators, who work in the field of growth and characterisation of organic films and devices and focus on the fabrication and characterisation of highly ordered functional organic films. The wide range of expertise of the contributing groups allows the combination of different methodologies and aspects of physics,

chemistry, and materials science for the design and understanding of well-defined organic structures.

Our vision is that functional organic molecules can be the basic building blocks for both low cost large area and new nano-scale devices, ranging from solar cells to chemical sensors. Because of the technological relevance and the applications that can be imagined for devices incorporating organic films it is important to understand the fundamental processes of organic film formation, the structures that are formed, their interfaces and their properties.

The scope of this book is such that it bridges the gap between fundamental research and basic applied sciences. This will contribute to new concepts and a knowledge base, which will have a direct impact in the fields of electronic, opto-electronic, and photovoltaic devices, as well as sensors and nanoscopic devices.

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