

Preface

For the solid/liquid interfaces modified with polymers, the interfacial properties would be significantly influenced by the polymer behavior. Understanding the interfacial polymer behavior is a prerequisite to control the interfacial properties and to prepare well-designed polymeric interfacial materials. Actually, the characterization and analysis of polymer behavior at interfaces still remain a great challenge, particularly for the dynamic behavior. In the past 10 years, quartz crystal microbalance with dissipation (QCM-D) has been successfully applied to study the polymer behavior at various solid/liquid interfaces. In comparison with the conventional QCM which can merely provide the change in frequency, QCM-D gives the information about not only the variations in mass, thickness and rigidity of the polymer layer but also the viscoelastic properties of the polymer layer. Therefore, it is anticipated that QCM-D would provide a clearer picture on the molecular interactions of the macromolecular systems at the solid/liquid interfaces.

This book is intended to give an overview of our recent studies on polymer behavior at the solid/liquid interfaces by use of QCM-D. It starts with a brief introduction of the basic principles of QCM-D to give readers a straightforward impression on what is QCM-D and what can be obtained from QCM-D measurements. In the following chapters, we will show that how QCM-D can be used to investigate the conformational change of grafted polymer chains, the grafting kinetics of polymer chains, the growth mechanism of polyelectrolyte multilayers, and the interactions between polymers and phospholipid membranes. The physical meaning of the shifts in frequency and dissipation and the advantages of QCM-D technique will be presented. We hope this book will be helpful to the readers to understand how to use QCM-D to study the polymer behavior at the solid/liquid interfaces. We also hope it can serve as a reference material for academic and industrial researchers working in the fields of polymers and interfaces.

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