

Book Review

Adsorption phenomena and anchoring energy in nematic liquid crystals

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The aim of this book is to present a special field of liquid crystal research: the theoretical treatment of the adsorption phenomena and their effects on the anchoring energy in nematic liquid crystals. This topic is not only of academic interest, it is also important with respect to practical applications because the alignment of nematic liquid crystals in displays (LCDs) is mainly determined by surface interactions and anchoring properties.

The book is organized as follows: The first part (chapters 1-4) is dedicated to the description of the nematic phase by the microscopical theory as well as by the continuum theory. In this context the external field contribution to the bulk elastic energy density is of particular interest with respect to the response of nematic liquid crystals to electric fields. Furthermore, the concept of bulk and surface elastic effects of quadrupolar interactions in nematic phases is discussed in detail.

The main part of the book (chapters 5-11) deals with the selective ion adsorption phenomena which are responsible for an ion separation inside the nematic liquid which is connected with an electric field distribution across the sample. The coupling of this field with the dielectric and flexoelectric properties gives rise to a dielectric energy density localized near to the substrates which corresponds to the surface energy. In this book a complete model for the determination of the electric field distribution of ionic origin in nematic liquid crystals is presented. In this context not only the static behaviour but also dynamic aspects of the ion adsorption are considered. To sum up it can be said that this book contains the first comprehensive presentation of the adsorption phenomena in nematic liquid crystals.

The book will be of interest for scientists who are familiar with theoretical and experimental aspects of surface and interface phenomena. This book can be also recommended to researchers (physicists, chemists, engineers) who are dealing with the alignment of liquid crystals on solid substrates.

Gerhard Pelzl