Record Nr. UNINA9910779010503321

Titolo Non-equilibrium soft matter physics [[electronic resource] /] / editors,

Shigeyuki Komura, Takao Ohta

Pubbl/distr/stampa Singapore, : World Scientific Pub. Co., 2012

ISBN 1-280-66957-8

9786613646507 981-4360-63-5

Descrizione fisica 1 online resource (435 p.)

Collana Series in soft condensed matter, , 1793-737X ; ; v. 4

Altri autori (Persone) KomuraShigeyuki

OhtaTakao

Disciplina 530.41

Soggetti Condensed matter

Equilibrium

Lingua di pubblicazione Inglese

Formato Materiale a stampa

Livello bibliografico Monografia

Note generali Description based upon print version of record.

Nota di bibliografia Includes bibliographical references and index.

Nota di contenuto Foreword; Preface; Contents; 1. Onsager's Variational Principle in Soft

Matter Dynamics M. Doi; 1. Introduction; 2. Particle Motion in Viscous Fluid; 2.1. Stokesian hydrodynamics; 2.2. Hydrodynamic reciprocal

relation; 2.3. Hydrodynamic variational principle; 3. Onsager's Variational Principle; 3.1. Onsager's kinetic equation; 3.2. Validity of the variational principle; 3.3. Merit of the variational principle; 3.4. Reciprocal relation in the kinetic equation; 3.5. Forces needed to

controll the state variables; 4. Brownian Motion; 4.1. Diffusion equation 4.2. Reciprocal relation in the diffusion equation 4.3. Forces acting on the semi-permeable membrane; 5. Rotational Brownian Motion; 5.1.

State variables of a rod-like particle; 5.2. Diffusion equation for (,); 5.3. Diffusion equation for (u); 5.4. Diffusion equation in flow field;

5.5. Expression for the stress tensor; 6. Coupling between Diffusion and Flow; 6.1. Diffusion in concentrated solutions; 6.2. Coupling

between solute diffusion and solution flow; 6.3. Phase separation; 7. Gel Dynamics; 8. Liquid Crystals; 9. Conclusion; Acknowledgments Appendix A. Proof of the Hydrodynamic Reciprocal Relation References;

2. Rheo-Dielectric Behavior of Soft Matters H. Watanabe, Y. Matsumiya,

K. Horio, Y. Masubuchi and T. Uneyama; 1. Introduction; 2. Basics of

Dielectric Relaxation; 2.1. Instrumentation; 2.2. Phenomenological framework; 2.3. Molecular expression of (t); 3. Rheo-Dielectric Behavior of Polymers: 3.1. Glassy relaxation and rubbery relaxation: 3.2. Rheo-dielectric behavior of entangled chain; 3.2.1. Overview; 3.2.2. Flow-induced equilibration of entanglement segments; 3.2.3. Mutual equilibration number of entanglement segments 3.2.4. Lack of flow-induced dielectric acceleration for linear chain 4. Rheo-Dielectric Behavior of Liquid Crystalline Materials; 4.1. Rheodielectric behavior of nematic 7CB; 4.2. Rheo-dielectric behavior of smectic 8CB; 5. Rheo-Dielectric Behavior of Salt/PEO Composite Systems; 5.1. Overview of rheo-dielectric behavior of LiClO4/PEO System; 5.2. Flow-induced enhancement of Li+ mobility; 6. Rheo-Dielectric Behavior of Carbon Black Suspensions: 7. Concluding Remarks: Acknowledgment: Appendix A. Rheo-Dielectric Telaxation Function of Type A Chain; A.1. General; A.2. Analysis under steady shear

A.3. Analysis under LAOS Appendix B. Macdonald Theory for Electrode Polarization; References; 3. Morphology and Rheology of Immiscible Polymer Blends in Electric and Shear Flow Fields H. Orihara; 1. Introduction; 2. Experimental System for Observing Three-Dimensional Structures; 3. Droplet Coalescence Process Under Electric Fields; 3.1. 3D observation of coalescence process; 3.2. Scaling property and hierarchical model; 4. Shear Modulus of Columnar Structure Formed in an Immiscible Polymer Blend Under Electric Fields; 4.1. 3D observation of columnar structure and shear modulus

4.2. Theoretical derivation of static shear modulus

Sommario/riassunto

Soft matter is a concept which covers polymers, liquid crystals, colloids, amphiphilic molecules, glasses, granular and biological materials. One of the fundamental characteristic features of soft matter is that it exhibits various mesoscopic structures originating from a large number of internal degrees of freedom of each molecule. Due to such intermediate structures, soft matter can easily be brought into non-equilibrium states and cause non-linear responses by imposing external fields such as an electric field, a mechanical stress or a shear flow. Volume 4 of the series in Soft Condensed Ma