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Nota di contenuto	Frontmatter -- Preface -- Contents -- List of contributing authors -- 1 Magneto-mechanical coupling of single domain particles in soft matter systems -- 2 Hybrid magnetic elastomers prepared on the basis of a SIEL-grade resin and their magnetic and rheological properties -- 3 Magnetic hybrid materials in liquid crystals -- 4 Synthesis of magnetic ferrogels: a tool-box approach for finely tuned magnetic- and temperature-dependent properties -- 5 Studies about the design of magnetic bionanocomposite -- 6 Hybrid nanomaterials of biomolecule corona coated magnetic nanoparticles and their interaction with biological systems -- 7 Functionalization of biopolymer fibers with magnetic nanoparticles -- 8 Multifunctionality by dispersion of magnetic nanoparticles in anisotropic matrices -- 9 Magnetic measurement methods to probe nanoparticle-matrix interactions -- 10 Magnetic characterization of magnetoactive elastomers containing magnetic hard particles using first-order reversal curve analysis -- 11 Microscopic understanding of particlematrix interaction in magnetic hybrid materials by element-specific spectroscopy -- 12 Magnetic particle imaging of particle dynamics in complex matrix systems -- 13 Rotational dynamics of magnetic nanoparticles in different matrix systems -- 14 Dielectric behaviour of magnetic hybrid materials -- 15 Magneto-mechanical properties of elastic hybrid composites -- 16 Magnetic torque-driven deformation of Ni-nanorod/hydrogel nanocomposites -- 17 The microstructure of magnetorheological

materials characterized by means of computed X-ray microtomography -- 18 Magnetic field controlled behavior of magnetic gels studied using particle-based simulations -- 19 Magnetostriction in elastomers with mixtures of magnetically hard and soft microparticles: effects of nonlinear magnetization and matrix rigidity -- 20 Internal structures and mechanical properties of magnetic gels and suspensions -- 21 Symmetry aspects in the macroscopic dynamics of magnetorheological gels and general liquid crystalline magnetic elastomers -- 22 Modeling and theoretical description of magnetic hybrid materials-bridging from meso- to macro-scales -- 23 Structure and rheology of soft hybrid systems of magnetic nanoparticles in liquid-crystalline matrices: results from particle-resolved computer simulations -- 24 Multiscale modeling and simulation of magneto-active elastomers based on experimental data -- 25 Multiphysics modeling of porous ferrogels at finite strains -- 26 Magnetoactive elastomers for magnetically tunable vibrating sensor systems -- 27 Actuators based on a controlled particlematrix interaction in magnetic hybrid materials for applications in locomotion and manipulation systems -- 28 Magnetic hybrid materials interact with biological matrices -- 29 SPIONs and magnetic hybrid materials: Synthesis, toxicology and biomedical applications -- Index.

Sommario/riassunto

Externally tunable properties allow for new applications of magnetic hybrid materials containing magnetic micro- and nanoparticles in sensors and actuators in technical and medical applications. By means of easy to generate and control magnetic fields, changes of the internal particle arrangements and the macroscopic properties can be achieved. This monograph delivers the latest insights into multi-scale modelling, experimental characterization, manufacturing and application of those magnetic hybrid materials.