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Design of Nanostructures

By Bohidar, Himadri B. / Rawat, Kamla

Condition: New. Publisher/Verlag: Wiley-VCH | Self-Assembly of Nanomaterials | Adopting a unique approach, this book provides a thorough, one-stop introduction to nanoscience and self-assembly of nanomaterials composed of such materials as metals, metal oxides, metal sulphides, polymers, and biopolymers. Clearly divided into three sections covering the main aspects of nanoscience, the first part deals with the basic principles of nanoscale science. Alongside essential approaches and forces, this section also covers thermodynamics, phase transitions, and applications to biological systems. The second and third parts then go on to provide a detailed description of the synthesis of inorganic and organic nanoparticles, respectively. With its interdisciplinary content of importance to many different branches of nanoscience, this is essential reading for material scientists, physicists, biophysical chemists, chemical engineers, and biotechnologists alike. | PART I: NANOSCALE SCIENCE INTRODUCTION ESSENTIAL APPROACHES AND FORCES Top-down Approach Bottom-up Approach Aggregation of Nanoparticles Smoluchowski Aggregation Kinetics DLVO Theory Lennard-Jones Potential Hydrogen Bonding Hydrophobic Interactions Steric Forces THERMODYNAMICS OF NANO SYSTEMS Thermodynamics at Nanoscale Laws of Thermodynamics Concept of Entropy Gibbs Equation Thermodynamic Properties PHASE TRANSITIONS AND STABILITY AT NANOSCALE Generalized Observations Formation of Metastable Phases Stability of Small Objects Chemical Reactions in Nanosystems INTERACTIONS WITH BIOMOLECULES AND APPLICATIONS TO BIOLOGY Quantum Dot-Protein Interaction Nanoclay-Protein Interaction DNA-nanoclay Interaction Size dependent effect on enzymatic activity Applications to Biology PART II: BOTTOM-UP ASSEMBLY OF INORGANIC NANOPARTICLES METAL NANOPARTICLES Gold Nanoparticles Silver Nanoparticles Palladium Nanoparticles Platinum Nanoparticles Samarium Nanoparticles Copper Nanoparticles Cobalt...



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