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For the past three decades, nanoscale science and engineering have provided many systems with unique and unprecedented properties illustrating that these will definitely determine the trajectory of science and technology for years to come. This book is the first textbook to introduce nanoscale systems in a pedagogical, and not research, style. Through ample examples and problems, it emphasizes the difference between bulk and nanoscale systems from a thermodynamic viewpoint and illustrates the process when a bulk system enters the nanoscale domain. It also brings together results of the state-of-the-art research and provides the reader with the scientific foundations of such results. It introduces the fundamental thermodynamic treatment of nanoscale systems as well as the structure, properties, and performance of the three different types of fullerenes, namely, spherical, cylindrical, and planar or graphene. In addition, it discusses 2-D materials systems based on such building blocks. Finally, it shows the thermodynamic criteria allowing nanoscale performance in physically huge systems.



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