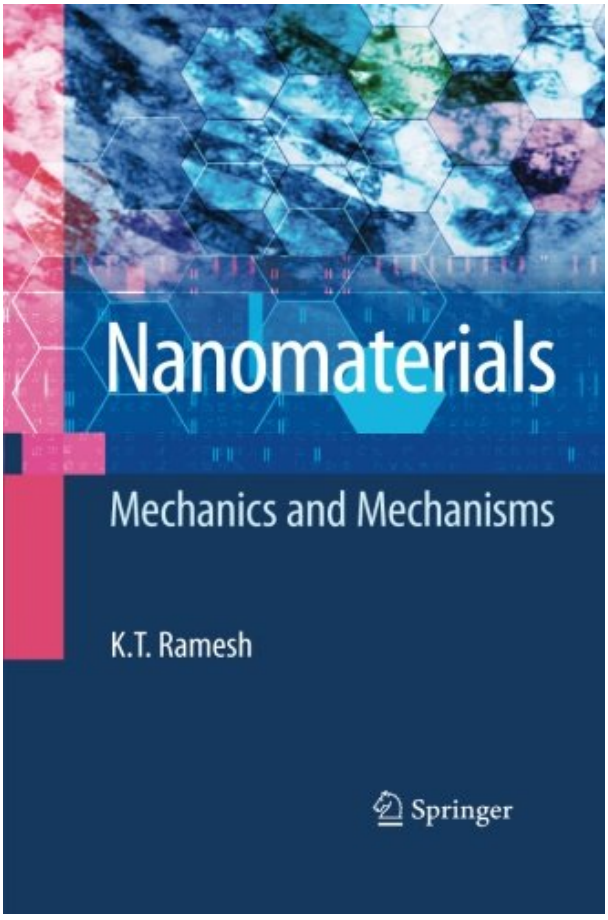
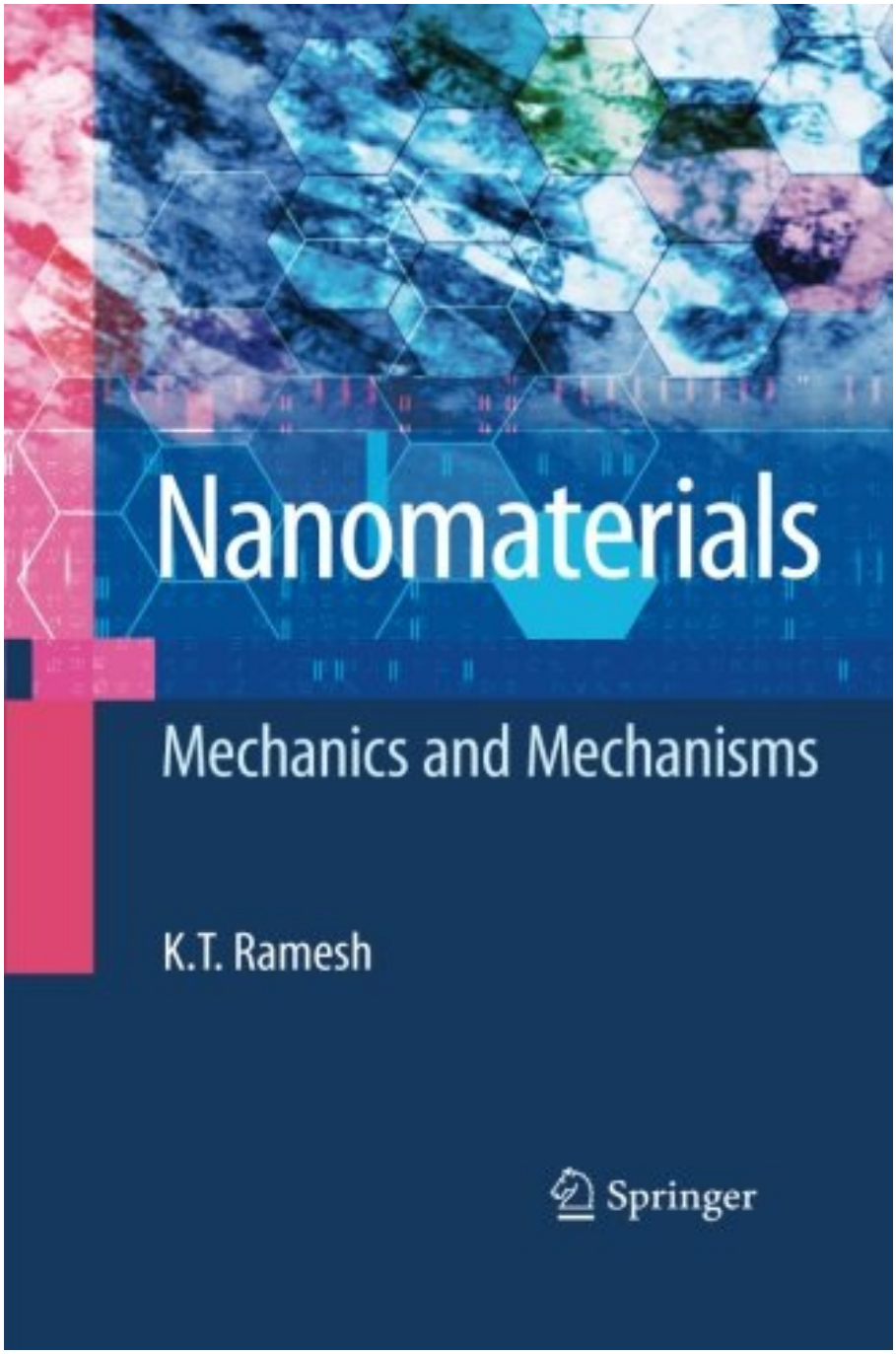
NANOMATERIALS: MECHANICS AND MECHANISMS BY K.T. RAMESH





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Review
From the reviews:

"This is a very well written book: clear, analyzes and teaches you what it is all about, anticipates questions and answers them. Very reader-friendly, a rather rare quality!"

"It covers all the fundamentals of mechanical properties, written by someone who knows them well, with a sensible approach, covering all the literature up to date and giving you the complete picture as well as the details. One learns not only nanomaterials, but materials in general."

"The book is totally self-contained, covers all the necessary background in mechanics and goes to a good enough level of covering molecular dynamics and carbon nanotubes. It will become indispensible for students/researchers in several of the areas covered: from nano-indentation, to grain size effects, to nano-devices."

"The fact that the author is primarily an experimentalist accounts for a presentation grounded on experiments and what they measure and do not measure (due to limitations), with the theory presented as the quantitative modeling of what is observed, rather than abstract theories of material behavior. I find this extremely valuable in shaping a way of approach that is the way of understanding the leading mechanisms of complex physical phenomena."

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From the Back Cover

The enabling science in much of nanotechnology today is the science of nanomaterials; indeed in the broadest sense, nanotechnology would not be possible without nanomaterials. Nanomaterials: Mechanics and Mechanisms seeks to provide an entrè into the field for mechanical engineers, material scientists, chemical and biomedical engineers and physicists. The objective is to provide the reader with the connections needed to understand the intense activity in the area of the mechanics of nanomaterials, and to develop ways of thinking about these new materials that could be useful to both research and application. The book covers all of the fundamentals of the mechanical properties of materials in a highly readable style, and integrates most of the literature on the emerging field of nanomaterials into a coherent body of knowledge.

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This book grew out of my desire to understand the mechanics of nanomaterials, and to be able to rationalize in my own mind the variety of topics on which the people around me were doing research at the time. The ?eld of nanomaterials has been growing rapidly since the early 1990s. I- tially, the ?eld was populated mostly by researchers working in the ?elds of synt- sis and processing. These scientists were able to make new materials much faster than the rest of us could develop ways of looking at them (or understanding them). However, a con?uence of interests and capabilities in the 1990s led to the exp- sive growth of papers in the characterization and modeling parts of the ?eld. That con?uence came from three primary directions: the rapid growth in our ability to make nanomaterials, a relatively newfound ability to characterize the nanomate- als at the appropriate length and time scales, and the rapid growth in our ability to model nanomaterials at atomistic and molecular scales. Simultaneously, the commercial potential of nanotechnology has become app- ent to most high-technology industries, as well as to some industries that are tra- tionally not viewed as high-technology (such as textiles). Much of the rapid growth came through the inventions of physicists and chemists who were able to develop nanotechnology products (nanomaterials) through a dizzying array of routes, and who began to interface directly with biological entities at the nanometer scale. That growth continues unabated.

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classical treatment; no quantum mechanics
By W Boudville
Ramesh furnishes a description of nanomaterials well suited for an engineer or scientist from a variety of disciplines. The treatment is characterised by staying in the classical regime. This is not a quantum treatment.

Instead, the descriptions of such important ideas like deformation, elasticity and strain should be familiar from textbooks covering larger scales.

What is perhaps most different is the excursion into experimental methods. Many new techniques have been devised to handle the small scales involved, like nanoindentation and microcompression. Fascinating and

ingenious. You should find the explanations easy to follow. Ramesh concentrates on the essentials of each method without drowning you in experimental details.

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