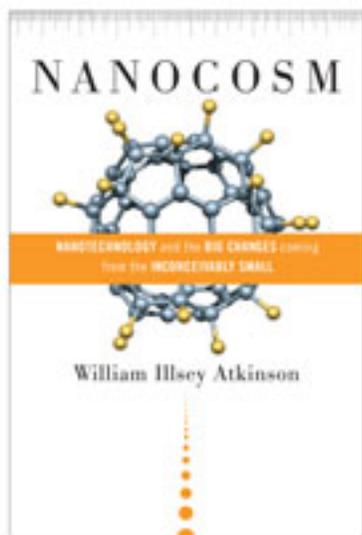


Big Things from Small Science



Nanocosm: Nanotechnology and the Big Changes Coming from the Inconceivably Small
William Illsey Atkinson

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As the hype-laden echoes of the “nano” revolution slowly fade into the background, research into nanotechnology has started to shift its focus from an “I wonder what happens if” phase to a “So what can I do with it?” phase. Journal pages are beginning to fill with the sober second thoughts of researchers who are trying to apply neat and tidy nanoconcepts to the messy worlds of physics, chemistry, and biology. In some cases, these scientists are making bold statements about the future, but more often, they are merely whispering about what we can do today. It is on behalf of this latter group that Bill Atkinson wrote *Nanocosm*.

Atkinson is a journalist from North Vancouver (Canada) who has been writing about science for more years than he would like to admit, having appeared in a variety of newspapers and magazines including *Today's Chemist at Work*. In *Nanocosm*, Atkinson brings his effusive and sometimes castigating style to the various fields of materials science,

genomics, and business as he tries to separate the myth from the math in nanotechnology, traveling the globe to talk to the people on the front line of research and marketing.

Atkinson starts his book with a short history of nanotechnology and a metric marathon from the macroscopic to the microscopic and beyond, trying to put the nano realm in its place. He also introduces some of the main characters who might be considered the progenitors of nanotechnology—specifically, Richard Feynman, who conceptually presented nanotechnology in his seminar “There’s plenty of room at the bottom”, and Eric Drexler, the author of the first book about nanotechnology, *Nanosystems: Molecular Machinery, Manufacturing, and Computation*. By the third chapter, however, Atkinson begins to focus on what is happening today, starting with an analysis of materials science and its role as the foundation of nanotechnology.

The next several chapters continue Atkinson’s explorations into the practical realities of nanotechnology. In one section, he discusses the financial requirements of nanotech research, describing the effects of the Clinton National Nanotechnology Initiative and how the dot-com implosion might actually have released funds that had previously been swallowed by Web and software development. In another section, Atkinson describes the use of quantum tunneling technology as a method to transfer waste heat and how research into microflu-

idics is changing the medical diagnostics industry.

As Atkinson talks to the people on the front lines of nanotechnology, he discovers that one of the biggest challenges nanotech engineers will face is that the concept of “same only smaller” might not hold true. It was (and is) firmly believed by some researchers that moving from the microworld to the nanoworld simply required that everything become magnitudes smaller. But as theory becomes reality, researchers are finding that physical concepts largely ignored in the macroworld, such as Brownian motion and Van der Waals interactions, have become overwhelming challenges in the nanoworld. When you function at the size of an atom, a random photon can become a serious problem. Given these problems, nanotech engineers have to rewrite the design manuals.

There are two challenges to reading *Nanocosm*, however. Atkinson’s writing style is very personal and a little scattered, something he fully admits in his foreword. He isn’t presenting this material as an exhaustive or definitive survey of nanotechnology. Rather, he is writing about the things and people he finds interesting. At times, his personality can overwhelm the reader and he can come across as glib or coarse. Which leads to the second challenge.

Atkinson is not a fan of Eric Drexler, and he presents his disdain for the man in no uncertain terms. In small doses, littered throughout the book, his anti-Drexler stance can be overlooked. But in Chapter 5, Atkinson begins a discussion of Drexler and his scientific shortcomings that borders on a rant. Although there appears to be validity in Atkinson’s arguments, his venomous approach can be tiresome and this section can be skipped in favor of Chapter 6.

These challenges aside, however, *Nanocosm* is a pleasure to read. Somewhere between Richard Feynman and Douglas Adams are the writings of Bill Atkinson. If readers keep this in mind, they will enjoy the book immensely.

Randall C. Willis ♦

More for the Shelf

Nanotechnology Gregory Timp (Ed.). Springer-Verlag, 1999.

Nanosystems: Molecular Machinery, Manufacturing, and Computation K. Eric Drexler. John Wiley & Sons, Ltd., 1992.

Feynman Lectures on Physics Richard Feynman. Addison-Wesley Publishing Co., 1970.