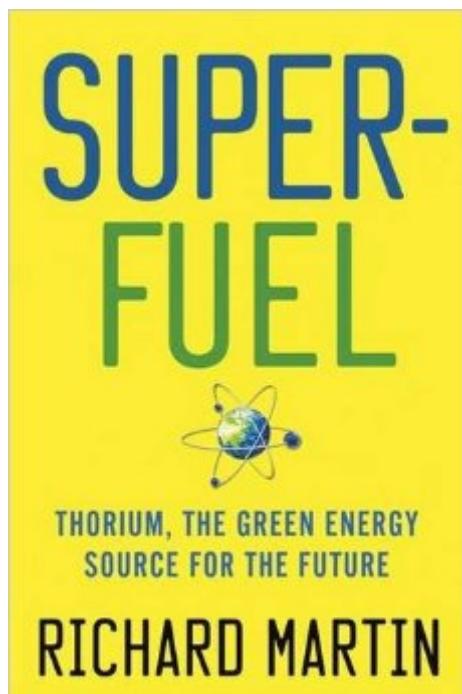


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SuperFuel: Thorium, The Green Energy Source For The Future (MacSci)



Synopsis

A riveting look at how an alternative source of energy is revolutionising nuclear power, promising a safe and clean future for millions, and why thorium was sidelined at the height of the Cold War In this groundbreaking account of an energy revolution in the making, award-winning science writer Richard Martin introduces us to thorium, a radioactive element and alternative nuclear fuel that is far safer, cleaner, and more abundant than uranium. At the dawn of the Atomic Age, thorium and uranium seemed to be in close competition as the fuel of the future. Uranium, with its ability to undergo fission and produce explosive material for atomic weapons, won out over its more pacific sister element, relegating thorium to the dustbin of science. Now, as we grapple with the perils of nuclear energy and rogue atomic weapons, and mankind confronts the specter of global climate change, thorium is re-emerging as the overlooked energy source as a small group of activists and outsiders is working, with the help of Silicon Valley investors, to build a thorium-power industry. In the first book mainstream book to tackle these issues, *Superfuel* is a story of rediscovery of a long lost technology that has the power to transform the world's future, and the story of the pacifists, who were sidelined in favour of atomic weapon hawks, but who can wean us off our fossil-fuel addiction and avert the risk of nuclear meltdown for ever.

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Customer Reviews

The story of thorium as a planetary energy source is almost too incredible to be believed. To think

that for almost seventy years we have known about a source of energy that would last longer than the Sun will shine and we haven't exploited it? One has to wonder why. In this book Rick Martin does a marvelous job telling the amazing and true story of the almost forgotten power of element 90: thorium. During the Manhattan Project thorium was passed over for consideration because it wasn't practical for nuclear weapons, but after the war researchers discovered how thorium and its fissile derivative uranium-233 would be the best fuel for clean and safe nuclear reactors--they just didn't know exactly what form those reactors would take. Then in the 1950s and 1960s at Oak Ridge National Lab, Dr. Alvin Weinberg and his team figured out the right way--a revolutionary new kind of reactor that used liquid fluoride salts rather than solid ceramic pellets as a nuclear fuel. No one could believe that such a machine could work, but Weinberg's team actually built and operated two of them very successfully. But the atomic energy establishment in the United States and around the world wanted a plutonium fast breeder reactor--a reactor totally different in every way from Weinberg's safe fluoride-salt reactor--and they convinced Nixon to make it national policy, which he did in 1971. Then they used that position of strength to cancel all of the research at Oak Ridge in thorium and fluoride salts and they got Weinberg fired as director. Without their leader and their political support, the Oak Ridge team dissolved and disbanded and the notion of a safe, clean, efficient thorium reactor was lost. Nuclear engineering students don't learn about it today.

Please read this book. You may not agree with everything Martin writes (I don't). You may even want to scream at him (I did a couple of times). But this book is a very good opener for a discussion on an important subject that few are familiar with. Equally important, if the proponents of the liquid fluoride thorium reactors (LFTRs) are essentially right this technology offers an important contribution (not a panacea) to solving the energy crisis and alleviating global warming. This is not exactly a balanced book. Richard Martin is advocating for the thorium-based technology and makes no bones about it. At the same time, he does not ignore the problems of this technology (although to my taste he minimizes some of them, about which more below), and he makes a reasonable effort to be fair to competing views. The historical chapters are illuminating. If you have wondered how we ended up burning increasing amounts of fossil fuel sixty-odd years after we were hyperbolically promised "electricity too cheap to meter", Martin will show you. The technical chapters are good considering that this is a book for the general public and more detail is available in the blogosphere. The last chapters, which discuss present business activity and future prospects, are up-to-date and present a convincing case for allocating resources to the (re)development of this technology. Success is by no means guaranteed, but at this point I would rather see a couple of billions going

into LFTRs than into fusion or (heavens) into "clean" coal. Now here are things I'm not so crazy about (but you should read the book anyway!).

I looked forward to SuperFuel as an accessible exploration of molten salt breeder reactor technology and history, a comparison-and-contrast between the liquid fluoride thorium reactor (LFTR) and conventional reactors, a survey of current and past attempts at using thorium in power plants, a summary of the thorium/uranium fuel cycle, and an assessment of the barriers to adoption of LFTR and recommendations for action and change. Unfortunately, the book itself mirrors the history of its subject: SuperFuel has a very promising start, abruptly transitions to an extended disappointing and unproductive era until rediscovering its value at the end. Does it succeed or fail? The answer is complex. SuperFuel is essentially an extended work of advocacy journalism, and suffers from many of the problems common to that genre - oversimplification, excessive hyperbole, demonization of the status quo and one's perceived opponents, and selective inclusion and omission of evidence to suit the author's preordained conclusion. These are all forgivable sins to some degree but in SuperFuel Martin has taken what could have been a compelling tale of an exciting technology rediscovered and an inspiring manifesto for energy independence into an intensely negative, repetitive, and error-filled rant against uranium, conventional reactors, and anyone associated with them. The book is fraught with numerous technical and historical errors which calls into question how much of the technology and history Martin actually understands, thereby rendering much of what he presents as fact suspect. Entirely too much of the book is dedicated to a putative feud between Adm. Rickover and Alvin Weinberg.

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