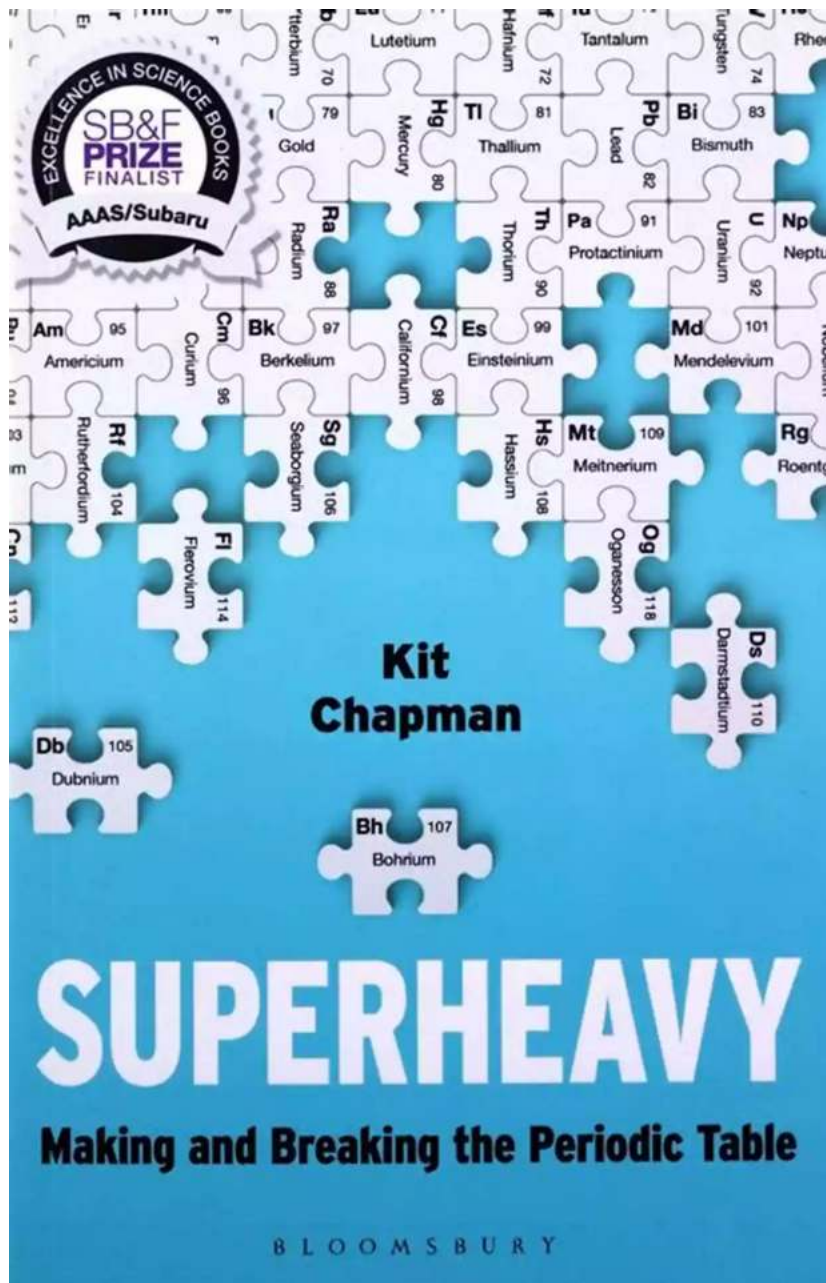


Superheavy Making And Breaking The Periodic Table

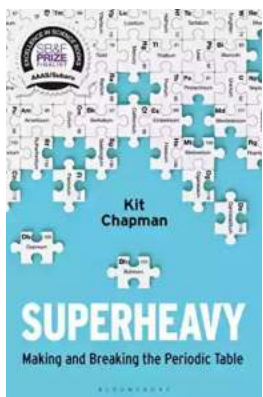


Throughout history, mankind has always been fascinated by the pursuit of knowledge and discovery. One area that has captivated the minds of scientists and researchers for centuries is the study of the periodic table. The periodic table is a cornerstone of chemistry, providing a framework to organize and understand

the properties of all known elements. But did you know that researchers are actively pushing the limits of the periodic table by creating new elements that are incredibly heavy?

Journey through the Periodic Table

The periodic table is an arrangement of all the known chemical elements, grouped by their atomic number, electron configuration, and recurring chemical properties. It was first introduced by the Russian chemist Dmitri Mendeleev in 1869. Mendeleev realized that by arranging the elements in a certain order, similarities in their properties could be observed and predicted. This breakthrough revolutionized the study of chemistry.



Superheavy: Making and Breaking the Periodic Table by Kit Chapman (Kindle Edition)

★★★★☆ 4.5 out of 5

Language	: English
File size	: 2598 KB
Text-to-Speech	: Enabled
Screen Reader	: Supported
Enhanced typesetting	: Enabled
Word Wise	: Enabled
Print length	: 301 pages



Traditionally, the periodic table was divided into periods (horizontal rows) and groups (vertical columns). The elements are organized this way to showcase trends and periodicities in properties such as atomic radius, electronegativity, and reactivity. This organization allows scientists to identify relationships and predict the behavior of different elements.

Creating Superheavy Elements

The periodic table we learn in school consists of 118 known elements. However, beyond this point, we enter the realm of superheavy elements. These elements have an atomic number exceeding 118, making them extremely rare and unstable. In fact, many of these elements only exist for a fraction of a second and decay rapidly.

Scientists can create superheavy elements through a process called nuclear transmutation. This involves bombarding a target element with a beam of accelerated nuclei, typically from a particle accelerator. By combining elements in high-energy collisions, researchers can force the nuclei to overcome electrostatic repulsion and stick together temporarily, forming a new, heavier element.

One of the most exciting developments in superheavy element research came in 2016 with the discovery of elements 113, 115, 117, and 118. These elements were officially recognized by the International Union of Pure and Applied Chemistry (IUPAC) and named Nihonium (Nh), Moscovium (Mc), Tennessine (Ts), and Oganesson (Og) respectively. This discovery marked the culmination of decades of research and opened up an exciting new chapter in the field of chemistry.

Theoretical Predictions and Island of Stability

As researchers continue to explore the uncharted territory of the superheavy elements, they rely on theoretical models to predict the properties of these elusive atoms. Calculations based on quantum mechanics provide insights into the behavior and stability of elements with an atomic number beyond the current limit.

One fascinating concept emerging from these predictions is the existence of an "island of stability". The island of stability suggests that once an atomic number reaches a certain threshold, the elements become more stable and may have longer half-lives. This means they exist for a longer period before decaying into lighter elements.

The quest to reach the island of stability is an ongoing challenge for scientists. Theoretical models predict that elements with atomic numbers around 120, 124, and 126 might possess the desired stability. These predictions fuel the curiosity and determination of researchers worldwide.

Implications and Applications

While the creation and study of superheavy elements may seem purely academic, there are potential practical applications that go beyond our current understanding. These elements exist in extreme conditions and exhibit unique properties, which could have significant impacts on various fields.

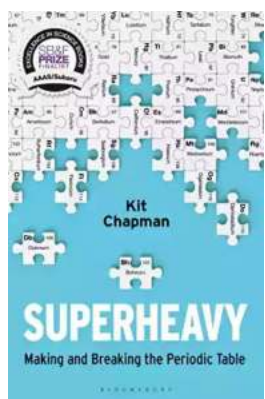
One area where superheavy elements could prove invaluable is nuclear physics. These heavy atoms can help scientists investigate and understand nuclear fission, fusion reactions, and the behavior of atomic nuclei in extreme energy environments. By gaining a deeper understanding of these processes, we can potentially develop new technologies and energy sources.

Additionally, superheavy elements could shed light on the origins of the universe. Studying their properties can provide insights into the fundamental forces and particles that govern our existence. A better understanding of these cosmic phenomena can expand our understanding of the universe and our place in it.

The Future of the Periodic Table

The journey of exploring the periodic table is far from over. Scientists are already contemplating the possibility of even heavier elements beyond the realm of superheavy elements. The quest for these elements and the constant expansion of the periodic table are a testament to human curiosity and ambition.

, superheavy elements are not only pushing the limits of the periodic table but also expanding our understanding of the fundamental building blocks of the universe. From the pioneering work of Mendeleev to the current discoveries, we continue to unlock new insights into the mysteries of the natural world. The periodic table, once thought to be complete, is now a testament to our relentless pursuit of knowledge and the infinite wonders that lie beyond.



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Shortlisted for the 2020 AAAS/Subaru SB&F Prize for Excellence in Science Books

Creating an element is no easy feat. It's the equivalent of firing six trillion bullets a second at a needle in a haystack, hoping the bullet and needle somehow fuse together, then catching it in less than a thousandth of a second – after which it's

gone forever. Welcome to the world of the superheavy elements: a realm where scientists use giant machines and spend years trying to make a single atom of mysterious artefacts that have never existed on Earth.

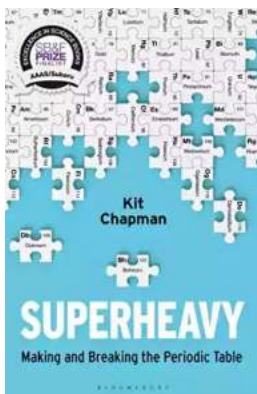
From the first elements past uranium and their role in the atomic bomb to the latest discoveries stretching our chemical world, Superheavy will reveal the hidden stories lurking at the edges of the periodic table. Why did the US Air Force fly planes into mushroom clouds? Who won the transactinoid wars? How did an earthquake help give Japan its first element? And what happened when Superman almost spilled nuclear secrets?

In a globe-trotting adventure that stretches from the United States to Russia, Sweden to Australia, Superheavy is your guide to the amazing science filling in the missing pieces of the periodic table. By the end you'll not only marvel at how nuclear science has changed our lives – you'll wonder where it's going to take us in the future.



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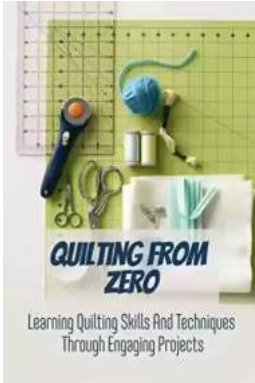
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