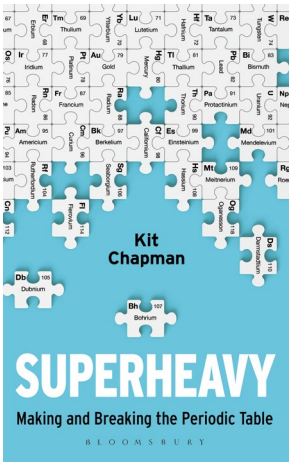
# All about that atomic weight




**Superheavy: Making and Breaking the Periodic Table**
*Edited by Kit Chapman*
Bloomsbury Sigma, 2019, 304pp, £16.99.

If you are falling behind in celebrating the international year of the periodic table, the forthcoming book *Supeheavy: Making and Breaking the Periodic Table* may provide sufficient incentive to overcome your procrastination. The title *Superheavy* might conjure images of a book that chronicles the rise of Motörhead on the British heavy metal scene, or provide a retrospective on how The Fat Boys helped open the door to beatboxing in rap music, but author Kit Chapman veers off in a slightly different direction. Chapman was, until recently, an editor at *Chemistry World* and focuses his scientific and writing experience on a book that recounts the events that led to the completion of the seventh row of the periodic table. He also manages to squeeze in a healthy dose of pop culture references in the process, including Motörhead fans ill-conceived petition to grant Lemmy an eponymic element in 2015.

The periodic table is iconic; however, outside the scientific community, most people are not familiar with many of its architects, with the possible exception of Dmitri Mendeleev. Likewise, since modern periodic tables have included several elements in the seventh row for decades, and most of those elements are too short-lived to directly impact daily life, neither the discovery stories nor the people who authored them are widely known. Given the Herculean task of creating and proving the existence of these elements, the stories in the book almost certainly would have been rejected as implausible fiction were they included in a script for a blockbuster movie on the Transfermium Wars.

Chapman's book is part science, part history, part multi-subject biography told chronologically with his travelogue interspersed throughout. When he reaches Berkeley, he realizes, as I once did, that one should pack a sweatshirt or two when visiting the Bay Area during the summer. Chapman also makes stops in Sweden, Japan, Italy and several other countries to trace the steps of the element hunters who pushed the limits of nuclear chemistry to fill in the periodic table. In particular, Chapman spends time at the Joint Institute for Nuclear Research in Dubna, Russia, interviewing Yuri Oganessian, who lends his name to element 118 — oganesson. Oganessian is the only person other than Glenn Seaborg to be granted this honour during his lifetime, and he provides the colour of personal experience to decades old stories from behind the Iron Curtain.

Post-World War II politics feature prominently in almost half of *Superheavy*, as the creation and testing of nuclear weapons helped spark the race to create new elements. These stories feature Alberto Ghiorso and Seaborg squaring off with Oganessian and Georgy Flyorov in a transnational proxy war for global supremacy between the United States and the Soviet Union. Much of the American perspective was recounted in 2000's *The Transuranium People*, which Chapman summarizes and seamlessly blends with the accounts from complimentary and competing stories from Russian and other contributors. For younger readers, *Superheavy* provides a compelling snapshot of the paranoia resulting from the Cold War as well as insight into the chemistry on the outskirts of the periodic table.

While many of the protagonists have passed away, Chapman manages to fill the gaps with stories documented in the archives, and consults with their former colleagues and current standard-bearers in modern element hunting. This includes an interview with Dawn Shaughnessy, Star Wars superfan and leader of the nuclear and radiochemistry group at Lawrence Livermore National Laboratory (LLNL). Shaughnessy was involved in the discovery of all the recently discovered elements, and was also the undisputed champion of the unofficial LLNL contest to see who could watch *Star Wars: The Force Awakens* the most times in theatres. These stories will undoubtedly make *Superheavy* more accessible to audiences with limited knowledge of nuclear chemistry, such as high school and college chemistry students. Although Chapman demonstrates a deep knowledge of science fiction, one might expect the next meeting of the Avengers to be a little awkward when Thor cites Chapman's assertion that thorium is the only comic book character to appear on the periodic table. Captain America and Iron Man might disagree with that claim. Chapman should be prepared as Titanium Man, Cobalt Man and all the Metal Men also might pay him a visit in the not too distant future.

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*Superheavy* ends with a perspective on the uncharted territory scientists need to explore in order to continue expanding the periodic table. Beyond oganesson, some models predict that relativistic effects will break the periodic table as we have understood it for the past 150 years. Extremely large nuclei might mean that the electrons will no longer reside in the neat shells one would expect using a classical understanding of the periodic table. These and other hypotheses and speculations demonstrate that the fascination with superheavy elements and the periodic table will not end with element 118, and hopefully will inspire curiosity in a new generation of scientists.

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**Competing interests**
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