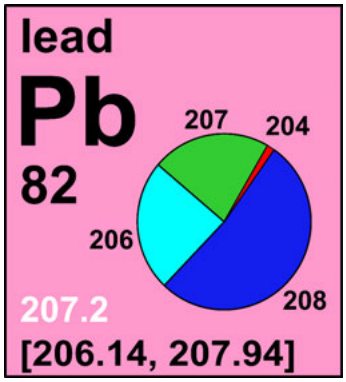
Standard Atomic Weight of Lead Revised

Following the recent publication of the IUPAC Technical Report on the variation of lead isotopic composition and atomic weight in terrestrial materials [1], the IUPAC Commission on Isotopic Abundances and Atomic Weights (CIAAW) is recommending changes to the standard atomic weight (*i.e.* relative atomic mass) of lead:

lead: to [206.14, 207.94] from 207.2 ± 0.1

The assignment of an interval for the new standard atomic weight reflects the common occurrence of variations in the atomic weights of lead in normal terrestrial materials which have been known for over a century [2]. If a single atomic-weight value is needed, the Commission recommends using 207.2 ± 1.1, which corresponds to the common lead with a symmetric uncertainty covering normal materials.

The isotopic composition and atomic weight of lead are variable in terrestrial materials because its three heaviest stable isotopes are stable end-products of the radioactive decay of uranium (^{238}U to ^{206}Pb and ^{235}U to ^{207}Pb) and thorium (^{232}Th to ^{208}Pb). These variations in isotope ratios and atomic weights provide useful information in many areas of science, including geochronology, archaeology, environmental studies, and forensic science. While elemental lead can serve as an abundant and homogeneous isotopic reference, deviations from the isotope ratios in other lead occurrences limit the accuracy with which a standard atomic weight can be given for lead. In a comprehensive review of several hundred publications and analyses of more than 8000 samples [1], published isotope data indicate that the lowest reported lead atomic weight of a normal terrestrial material is 206.1462 ± 0.0028, determined for a growth of the phosphate mineral monazite from the Lewisian complex in north-western Scotland, which contains mostly ^{206}Pb and almost no ^{204}Pb [3]. The highest published lead atomic weight is 207.9351 ± 0.0005 for monazite from a micro-inclusion, also from the Lewisian complex in north-western Scotland, which contains almost pure radiogenic ^{208}Pb [3].



The CIAAW continues to evaluate literature data which leads to identification of developments in the measurement science, recognition of new discoveries, and remains committed to modernize its technical guidelines and work towards further expansion of its website to include more historical databases.

These changes and considerations will be published in *Pure and Applied Chemistry* and can be found online at the website of the IUPAC Commission on Isotopic Abundances and Atomic Weights (ciaaw.org).

References

1. Zhu, Xiang-Kun, Benefield, Jacqueline, Coplen, Tyler B., Gao, Zhaofu and Holden, Norman E. Variation of lead isotopic composition and atomic weight in terrestrial materials (IUPAC Technical Report). *Pure and Applied Chemistry*, vol. 93, no. 1, pp. 155-166 (2021). https://doi.org/10.1515/pac-2018-0916
2. Soddy, F. The Atomic Weight of "Thorium" Lead. *Nature* 98, 469 (1917). https://doi.org/10.1038/098469a0
3. Zhu, Z.K., O'Nions, R.K., Belshaw, N.S., Gibb, A.J. Lewisian crustal history from in situ SIMS mineral chronometry and related metamorphic textures. *Chemical Geology*, vol. 136, no. 3–4, pp. 205-218 (1997). https://doi.org/10.1016/S0009-2541(96)00143-X

https://iupac.org/standard-atomic-weight-of-lead-revised/

PAC Cheminformatics Special Issue

***Pure and Applied Chemistry Special Issue*—Call for Papers: Cheminformatics: Data and Standards.**

IUPAC has long helped advance cheminformatics and chemical data standards. Examples include the development of the InChI chemical identifier and the JCAMP-DX family of spectroscopic data formats. These formats continue to evolve based on current needs of the community, and new cheminformatics standards initiatives are launching within IUPAC and related organizations, which seek to address gaps in, for example, chemical file formats, chemical metadata standards, and machine-readable data sharing. Cheminformatics standards advance research and teaching, and also facilitate the implementation of chemical processes.

This special issue seeks to continue the conversation around cheminformatics standards development, with the aim to review current standards available, as well as discuss future needed standards. Clearly identifying our current successes and limitations in

cheminformatics standards will serve to inform the community and help coordinate further standards development.

Example topics appropriate for this *Cheminformatics: Data and Standards* special issue may include:

1. Cheminformatics standards use-cases and workflows across disciplines.
2. Discussions around how cheminformatics standards advance research and teaching.
3. Perspectives related to current cheminformatics standards and future needs, for example interoperability and metadata considerations.
4. Cheminformatics datasets useful for teaching and/or validation.
5. Standardization needs related to infrastructure (*e.g.,* repositories), cheminformatics toolkits, or data sharing.
6. Conference, symposia, or workshop based outcomes related to cheminformatics standardization.

If you are interested in contributing to this Special Issue, please send a provisional title, together with the name and email address of the submitting author to Vincent Scalfani vfscalfani@ua.edu.

Guest Editors:

- Vincent Scalfani, University of Alabama
- Jonathan Goodman, University of Cambridge
- Ian Bruno, Cambridge Crystallographic Data Centre

Please see the *Pure and Applied Chemistry* Author Guidelines for specific manuscript preparation information at https://www.degruyter.com/journal/key/PAC/html. Note that typically articles in Pure and Applied Chemistry occupy 6-12 journal pages, however, we will also consider shorter discussions appropriate to the special issue. Manuscripts are due by September 30.

IUPAC Periodic Table Challenge 2020: Top Schools Announced

Following the success of the IYPT2019 [10.1515/ci-2020-0204], IUPAC continued the Periodic Table Challenge which not only had more questions, but also welcomed more participants! Since its start in 2019, more than 100 000 tests have been taken by keen players from 155 countries/territories all over the world. Since, the PT Challenge saw not only continued popularity but was translated into Arabic, Chinese, Russian, and Spanish. Countless schools have participated throughout the year and we are proud to announce the list of 15 most active schools that have showed great and sustained interest in the IUPAC Periodic Table Challenge:

TOP7 SCHOOLS

- Bal Bharati Public School, Navi Mumbai (India)
- Colegio Interamericano, Bogota (Colombia)
- Covenant University, Ota (Nigeria)
- STEM High School Qalyubia, Al Obour (Egypt)
- St. Francis English Medium High School, Machilipatnam (India)
- Tarlac State University, Tarlac (Philippines)
- Universidad Central del Este, San Pedro (Dominican Republic)

HONORABLE MENTION

- Anglo Sanskrit College, Khanna (India)
- Cluster School of SMK Methodist, Sibu (Malaysia)
- DAV Public School BRS Nagar, Ludhiana (India) Instituto "La Candelaria" Olmos, Buenos Aires (Argentina)
- National Public School Yeshwanthpur, Bangalore (India)
- STEM High School Dakahlia, Belkas (Egypt)
- SMK Ora et Labora BSD, Tangerang Selatan (Indonesia)
- Universidad del Valle de Atemajac, Guadalajara (Mexico)

The highlighted TOP7 SCHOOLS will receive the Periodic Table posters signed by chemistry Nobel Laureates which is made possible by the generous participation from 13 Nobel laureates. We thank Roald Hoffmann (Nobel Prize 1981), Jean-Marie Lehn (1987), Barry Sharpless (2001), Kurt Wüthrich (2002), Peter Agre (2003), Robert H. Grubbs (2005), Martin Chalfie (2008), Ada Yonath (2009), Robert J. Lefkowitz (2012), Ben Feringa (2016), Sir Fraser Stoddart (2016), Joachim Frank (2017), Frances Arnold (2018) for their support!

Winners of the 2021 IUPAC-Solvay International Award For Young Chemists

The International Union of Pure and Applied Chemistry and Solvay announce the winners of the 2021 IUPAC-Solvay International Award for Young Chemists, presented for the best Ph.D. theses in the chemical sciences, as described in 1000-word essays.