Goldschmidt 2024 Abstract
https://doi.org/10.46247/gold2024.24396

UID: The uranium isotope database

HAOYU LI[1] AND FRANÇOIS L.H. TISSOT[2]

[1]California Institute of Technology
[2]Caltech

Presenting Author: haoyu.li@caltech.edu

Motivation: An ever-increasing volume of geochemical and cosmochemical data is being produced each year, making the development of open-access databases (*e.g.,* GeoRoc, PetDB, PBDB, and ASTROMAT) critical to ensure rapid access to comprehensive and reliable datasets. Here, we report on a new database we created in response to the fast-growing field of uranium (U) isotopes. The study of U isotopes has found applications in a variety of fields, including geochronology, paleoredox reconstruction, magmatic differentiation, and environment remediation. With thousands of newly reported U isotope data each year, a real need exists for a comprehensive U isotope database (UID).

Data content: The UID [1] is a comprehensive, updatable uranium isotope database, in which we compiled >14,000 $^{238}U/^{235}U$ data from ~320 papers. To ensure data coherence and comparability, we renormalized the $^{238}U/^{235}U$ data to the CRM145 isotopic standard via a transparent and back-trackable approach. To enable data interpretation and analysis, all supporting metadata (*e.g.,* sample type, analytical method, concentrations, and other isotopes) were also included in the UID (over half a million entries).

Database structure: The UID consists of 10 spreadsheets. Six of them are subdatabases containing U isotope data, named *Standard*, *Terrestrial*, *Meteorites*, *Experimental*, *Forensic*, and *Precision*. These categories were chosen to be as independent and unambiguous as possible to avoid overlapping. The other four tabs are *References*, *Assumptions*, *Spike*, and *Constants*, which provide supplementary information for the database. All samples were distributed into the various subdatabases, using a set of standardized criteria based on the sample type and the scope of the study.

Database Accessibility: The UID is publicly accessible at: https://isotoparium.org/uid.

Ongoing and future development: The development of a web based UID graphical user interface (GUI) is ongoing. The GUI would allow users to search, filter, and export a customized subset of the UID. Interactive visualization tools and a streamlined protocol for data submission are also under development. An update on the development of these advanced features of the UID will be presented at the conference.

[1] Li, H. and Tissot, F.L., 2023. UID: The uranium isotope database. Chemical Geology, 618, p.121221.