THE UCLA COSMOCHEMISTRY DATABASE. B. Zhang[1] (bdzhang@ucla.edu), P. H. Warren[1], A. E. Rubin[1,2], K. A. Lehnert[3], L. R. Profeta[3], A. K. Johansson[3], P. Ji[3], J. D. Figueroa-Salazar[3], J. L. Mays[3], [1]Department of Earth, Planetary, and Space Sciences, University of California, Los Angeles, CA 90095-1567, USA, [2]Maine Mineral & Gem Museum, 99 Main Street, P.O. Box 500, Bethel, ME 04217, USA, [3]Lamont-Doherty Earth Observatory, Columbia University, Palisades, NY 10964, USA.

Introduction: The UCLA Cosmochemistry Database was initiated as a data rescue project aiming to archive a variety of cosmochemical data acquired at the University of California, Los Angeles. These data are essential tools for increasing our understanding of the nature and origin of extraterrestrial materials. The database will ensure that future studies can use and reference these data in the examination, analysis and classification of new extraterrestrial samples.

The database is developed in collaboration with the Astromaterials Data System (AstroMat), a NASA-funded data infrastructure that will provide persistent access to and archiving of the database. The UCLA Cosmochemistry Database is a project in progress. We will continue to make additions, updates, and improvements to the database.

Database Content: The database includes elemental compositions of extraterrestrial materials (including iron meteorites, chondrites, pallasites, mesosiderites, Apollo samples, howardites, eucrites, and diogenites) analyzed by John T. Wasson, Paul H. Warren and their coworkers using atomic absorption spectrometry (AAS), neutron activation analysis (NAA), and electron microprobe analysis (EMPA) at UCLA over the last six decades. Microscopic and photographic imagery will also be added at a later date. In their early studies of iron meteorites, the team used AAS to analyze Ni concentrations (e.g., [1, 2]) and RNAA to analyze Ge, Ga, and Ir concentrations (e.g., [3, 4]). The team started to use INAA to analyze iron meteorites, lunar samples, and stony meteorites starting from the late 1970s [5]. The INAA technique developed at UCLA evolved over time, and it produced most of the recommended compositions of meteorites in this database. Achondrites and lunar samples were analyzed mainly by INAA, although in most cases with some additional data obtained by a variant of EMPA that we call microprobe fused bead analysis (MFBA). These UCLA data have partly been published as journal papers, but most of the data were neither digitized nor stored in a single repository.

Database Development: Compositional data have been compiled by the UCLA team from publications, unpublished files, and laboratory records into datasets using Astromat spreadsheet templates that contain both the compositional data as well as rich metadata about the samples, analytical methods, and data quality. These datasets are submitted to the Astromat repository via Astromat's online submission tool. Astromat curators review the datasets for metadata completeness and correctness, register them with DataCite to obtain a DOI and make them citeable, and package them for long-term archiving. We have compiled data from 52 journal articles so far (primarily papers on iron and iron-stony meteorites, and chondrites), and each article has its own separate dataset.

Data and metadata of these datasets are then ingested into the Astromat Synthesis database, where they are fully integrated with astromaterials data from nearly 2,000 publications for advanced searching and mining.

Database Access: The UCLA datasets are publicly accessible at the Astromat Repository, where individual datasets can be searched and downloaded. The UCLA cosmochemical data can also be accessed as part of the Astromat Synthesis database, where they are identified as a special 'collection'. Users may search, filter, extract, and download customized datasets via the user interface of the Astromat Synthesis database (AstroSearch). Users will be able to access the UCLA Cosmochemistry Database directly from the home page of AstroMat (https://www.astromat.org/).

Future Improvements: We plan to include EMPA data of lunar samples and achondrites, and add scanned PDF files of laboratory notebooks and datasheet binders that are not commonly published in journals. These PDF files contain information on irradiation date, mass, elemental concentrations, classification for each iron specimen, and John Wasson's personal notes on meteorites. We will also add petrographic images generated by SEM including backscattered electron (BSE) images and energy dispersive spectroscopy (EDS) images, and the images generated by optical microscopy including cross-polarized images and plane-polarized light images.

The Astromat team is currently working to develop plotting tools for the interactive tables.

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