

## Astromat: Future-proofing astromaterials research

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The Astromaterials Data System (Astromat) is a NASA-funded data archive and discovery platform that provides services for publication, archiving, and integration of astromaterials sample-derived data. Astromat's mission is to make available data related to samples from Johnson Space Center Collections, including but not limited to data from samples returned from the OSIRIS-REx Mission, meteorites, and lunar samples.

Astromat applies the concept of the PetDB databases to deliver a fully integrated and harmonized synthesis database (AstroDB) to the research community that contains all published laboratory analytical data for astromaterials samples curated at NASA's Johnson Space Center, including samples collected by the Apollo missions, meteorites, cosmic dust, and other materials returned from space. Astromat builds on previous efforts such as the MoonDB database [1], but upgraded the PetDB architecture to a state-of-the-art cyberinfrastructure that provides a seamless end-to-end experience for the archive and reuse of astromaterials data. This new state-of-the-art cyberinfrastructure is now used to enhance PetDB's capabilities, usability, and performance.

Consistent with PetDB's approach to collaborate with other data systems and engage the community, Astromat has built partnerships with other data systems such as MetBase, and is providing support for data rescue projects, with a successful publication of the UCLA Cosmochemistry Database [2].

Astromat is also part of broader efforts for standardizing harmonized vocabularies for its content. It joined the OneGeochemistry Initiative in its incipient stage and participated in the publication of a comprehensive analytical methods vocabulary [3] with partner systems EarthChem, GEOROC, Geo.X, and OSIRIS-REx.

With its broadening holdings and analysis-ready data capabilities, Astromat seeks to provide tools for novel research applications and meta-studies to advance astromaterials studies for decades to come.

[1] Lehnert, Kerstin A., et al. "MoonDB: Restoration and Synthesis of Lunar Petrological and Geochemical Data." Lunar and Planetary Science Conference. No. JSC-CN-35154. 2016.

[2] Zhang, Bidong, et al. "The UCLA Cosmochemistry Database." *Scientific Data* 10.1 (2023): 874.

[3] Lehnert, K. 2023. Analytical Methods for Geochemistry and Cosmochemistry. Concept Scheme for Analysis Methods in