Carbonaceous Meteorite Working Group

Reprints on Phyllosilicates and related materials

Spreadsheet (.xlsx) file describing the Spectral Minerals and Chemicals described at different levels of detail in the MRD-118/140/159 table and in "Table 1" of the SAWG Phase C-D charter document. Includes fields for "detected at >5% abundance in any meteorite" and "detected in the spectrum of any asteroid":

Blind Test:

Most of the Blind Test data documents are on the SAWG main page.

Phase C/D Charter: Carbonaceous Meteorites (CMWG) – Lead: Keller

The CMWG is responsible for the analysis of carbonaceous meteorite samples that are analogous to the regolith expected on the surface of Bennu. It is the responsibility of the CMWG to define the sample set to be used to generate the test data for the Spectral Processing element of the SPOC, the laboratory requirements for acquiring these spectra, and the sample analysis plan for acquiring the ancillary data required to properly interpret each spectrum. The spectral test data should contain material that is consistent with the top--level science objectives of the mission to return organic and volatile--rich asteroid regolith to Earth. It should also include material that may be encountered on an asteroid surface but is devoid of these compounds of interest. It is expected that these test data will be developed without direct interaction with the SAWG to ensure a true blind test of our spectral processing capabilities with particular emphasis on our ability to identify organic and volatile--rich material for sample--site selection.

The SPOC is responsible for developing the test--data Interface Control Documents (ICD), Software Interface Specifications (SIS), and Operational Interface Agreements (OIAs). The SAWG will contribute to the definition of these data requirements to ensure that they accurately represent OVIRS and OTES data produced from the pipeline processing at the SPOC during the asteroid encounter. The CMWG will develop the test data and deliver it to the SPOC. The SAWG will analyze the OVIRS test data using the spectral parameters derived from RELAB data, telescopic observations of carbonaceous asteroids, and any other relevant, existing data set. The SAWG will analyze the OTES test data using the ASU--developed standard mixing model in the Davinci software package and spectral data that currently exist in the official ASU spectral library.

The SAWG will work with the SPOC and the rest of the Science Team to perform the mixture modeling and spectral parameter tests using the CMWG test data. The SAWG will deliver a report describing the minerals and chemicals detected using spectral--parameter analysis on simulated OVIRS data and the relative abundances of phases determined using deconvolution analysis of simulated OTES data. The CMWG will determine whether or not

these tests were successful by comparing the species determined by spectral analysis to the petrographic characterization of the unknowns following completion of the spectral tests. The CMWG will write a report on the outcome of the test and deliver this to the PI Office. This report will inform next--step decisions that may trigger additional Phase C/D activities.

The CMWG is responsible for the following Deliverables in Phase C/D:

- Spectral Analysis Science Test Data (in collaboration with SPOC)
- Spectral Process Test Data Report

The CMWG will receive the following Receivables in Phase C/D:

- Science Software Phase C/D Development Schedule – from PI Office
- Spectral Library Implementation and Test Plan – from SPOC
- Data Products Menu – from SPOC
- Spectral Test Data Format Requirements – from SPOC

If resources are available (or if the spectral blind test described above fails) the CMWG may be asked to provide the following deliverables in Phase C/D:

- Analog Meteorite Science Report – BASELINE – This report will provide a detailed description of the data included in the mission spectral library. Details will include the samples to be analyzed, the techniques and facilities used in the analyses, and definition of the software and other procedures used to process the data. All spectral data and ancillary information will be in a uniform format to facilitate submission of relevant data by other team members and the science community.
- Analog Meteorite Journal Publication – DRAFT
- Customized Spectral Library – A collection of spectral data to be used by the Spectral Analysis Software to determine the mineralogy and gross organic content of spots of interest on the asteroid surface through processing of OVIRSand OTES data. In addition to the spectral properties and the laboratory conditions of collection, each spectrum in the library should have accompanying information on the bulk composition, mineralogy, petrology, texture, organic content and functional groups, and microstructure (where deemed appropriate) of the material of which the spectrum was collected.
- Spectral Library Product Descriptions, Algorithms, and Software (in collaboration with SPOC)
- A definition of the database structure for the meteorite spectra and all ancillary information. It should include a description of the graphical interface for the science team to access, search, and display data in the spectral library database.

OLD: Update 17-Dec-2013: The "Requirements" document for the spectral test data (SAWG, 9 Oct 2013) was marked up with comments from a small CMWG tiger team including Lindsay

Keller, Tim McCoy, Devin Schrader, Harold Connolly, and Lucy Lim. Harold has now delivered the marked-up version to Beth Clark and Vicky Hamilton for additional comments (due after the SPOC EPR the first week of January). After that, it will be posted here for the full CMWG and SAWG.