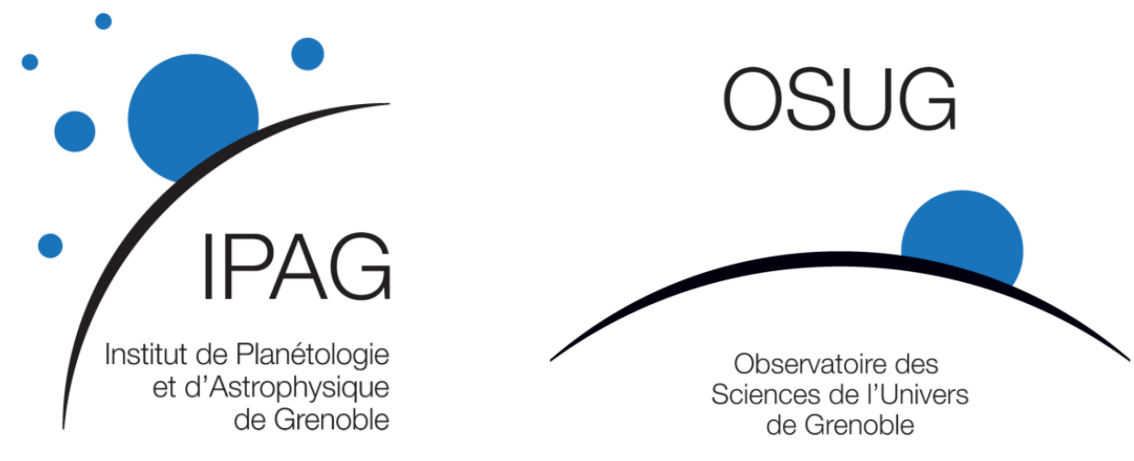


# SSHADÉ: THE EUROPEAN SOLID SPECTROSCOPY DATABASE INFRASTRUCTURE



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and the SSHADÉ Consortium Partners  
IPAG & OSUG, Grenoble, France + 21 laboratories in 11 countries  
([contact@sshade.eu](mailto:contact@sshade.eu))



- **Vis-IR Spectroscopy and spectro-imagery** are increasingly used in space missions to study the solid phases at their surface (ices, minerals, organic materials, ...).
- **Infrared, Raman, fluorescence and X-ray micro-spectroscopies** are also used to study **planetary and cosmo-materials**, in the laboratory and onboard landers and rovers.
- **Laboratory spectra of a variety of natural or synthetic materials** are needed to analyze the observations of solids at the surface or in the atmosphere of solar system bodies.

**What is SSHADÉ?** <https://www.sshade.eu> + <https://wiki.sshade.eu>

SSHADÉ hosts a set of specialized databases provided by various research groups and dedicated to astrophysics, planetary & material sciences, and geosciences.

**Content of SSHADÉ:** **Online since February 2018**

The **SSHADÉ databases** cover laboratory, field and simulated spectral data including various levels of products (e.g. transmission, reflectance, optical constants, Raman, ...)  
 ✓ **Types of samples:** synthesized or natural ices, minerals, rocks, organic and carbonaceous materials, terrestrial analogues, extra-terrestrial samples (meteorites, IDPs, Lunar soils, ...).  
 ✓ **Spectral ranges:** mostly covering the X, VUV, UV, Vis, Near/Mid/Far-IR & sub-mm.

## The SSHADÉ Project and Consortium

- ✓ **SSHADÉ project:** within VESPA activity of Europlanet 2020-RI
- ✓ **SSHADÉ consortium:** 23 partners in 21 labs from 11 countries
- ✓ **SSHADÉ infrastructure host:** OSUG Data Center (UGA).

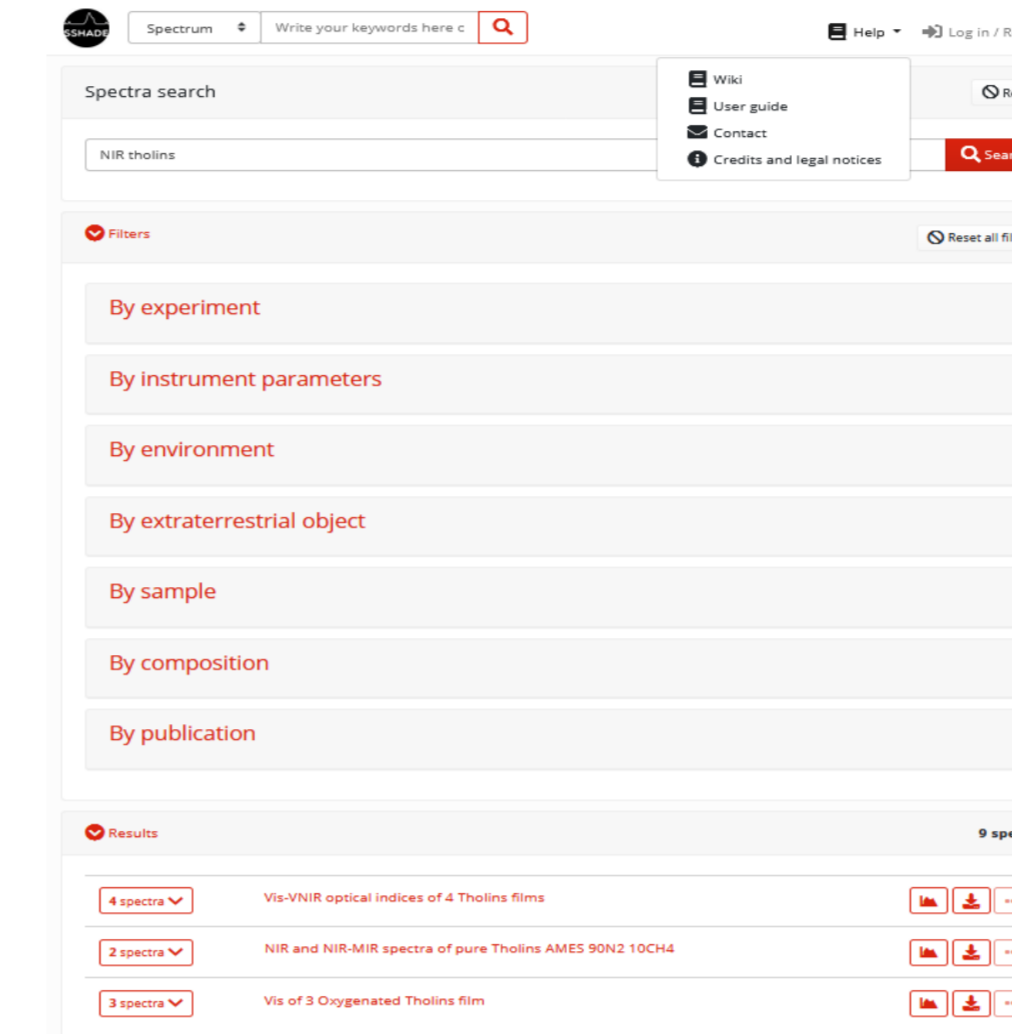


## The SSHADÉ Databases and typical content

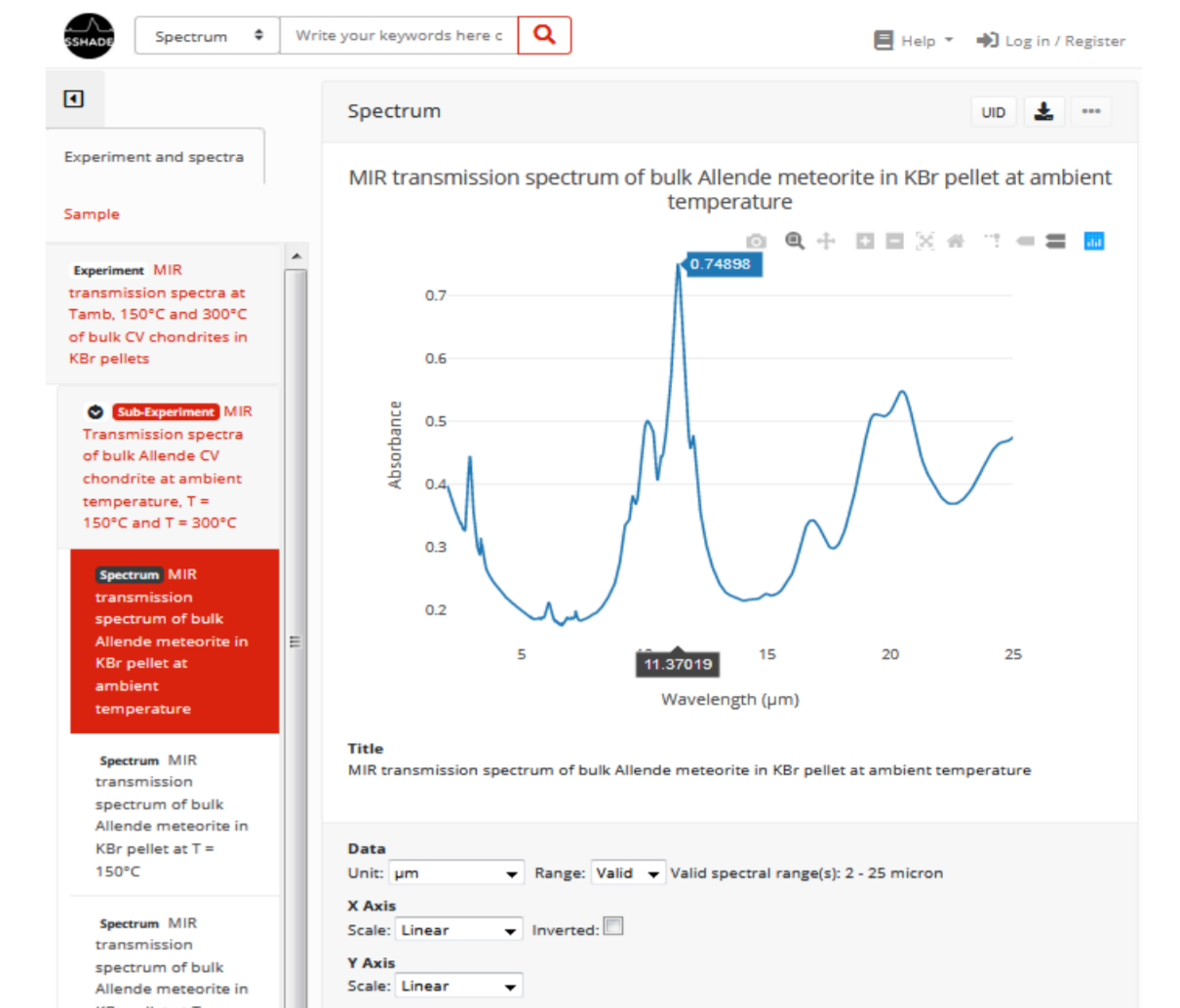
- ✓ **Over 2000 spectra already online** (from 250 experiments on over 1300 samples).
- ✓ Several hundreds under preparation or waiting public release! **Stay tuned!**
- ✓ **Below:** typical data you can find and download from the currently active databases

## SSHADÉ interface : Search tools

The user can search **spectral data** or **publications** through two complementary forms:  
 ✓ a simple **'Google-style' search bar**  
 ✓ a number of **specialized filters** to refine the search



SSHADÉ search tools for spectra: bar + filters



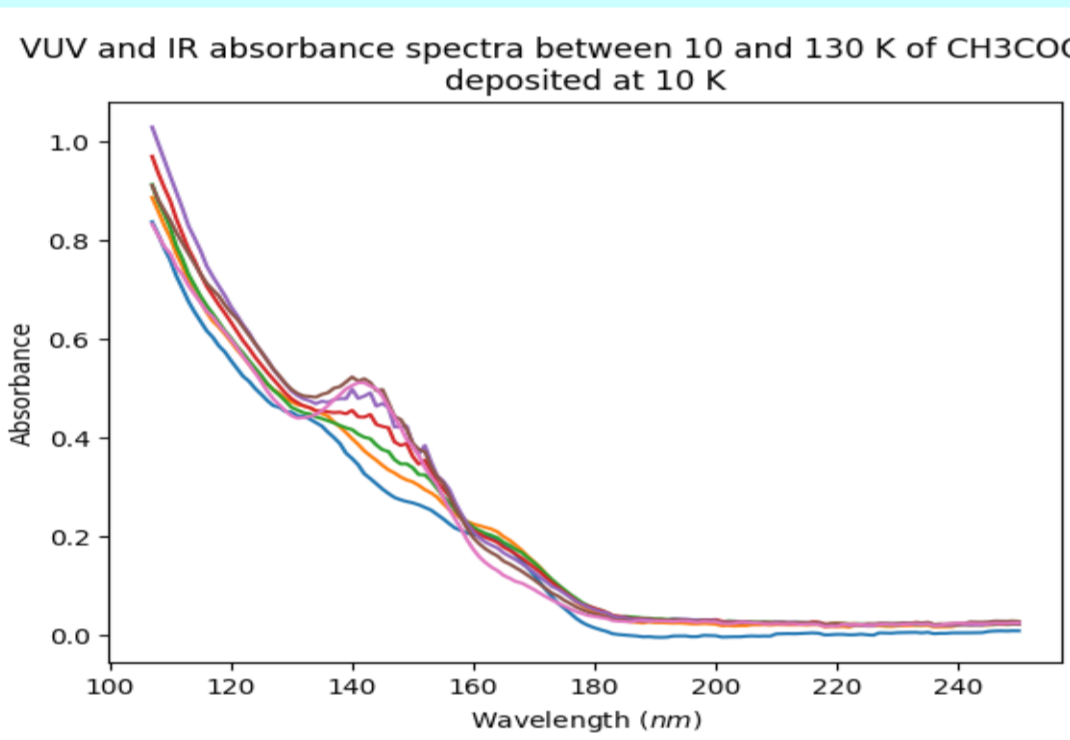
Interactive display for samples & spectra

## SSHADÉ interface : Display tools

The user can: select and **visualize the spectrum interactively**  
 ✓ have a look at the detailed information on the **experiment** or the **sample structure**  
 ✓ **download a spectrum** or an **experiment** with its associated sample information

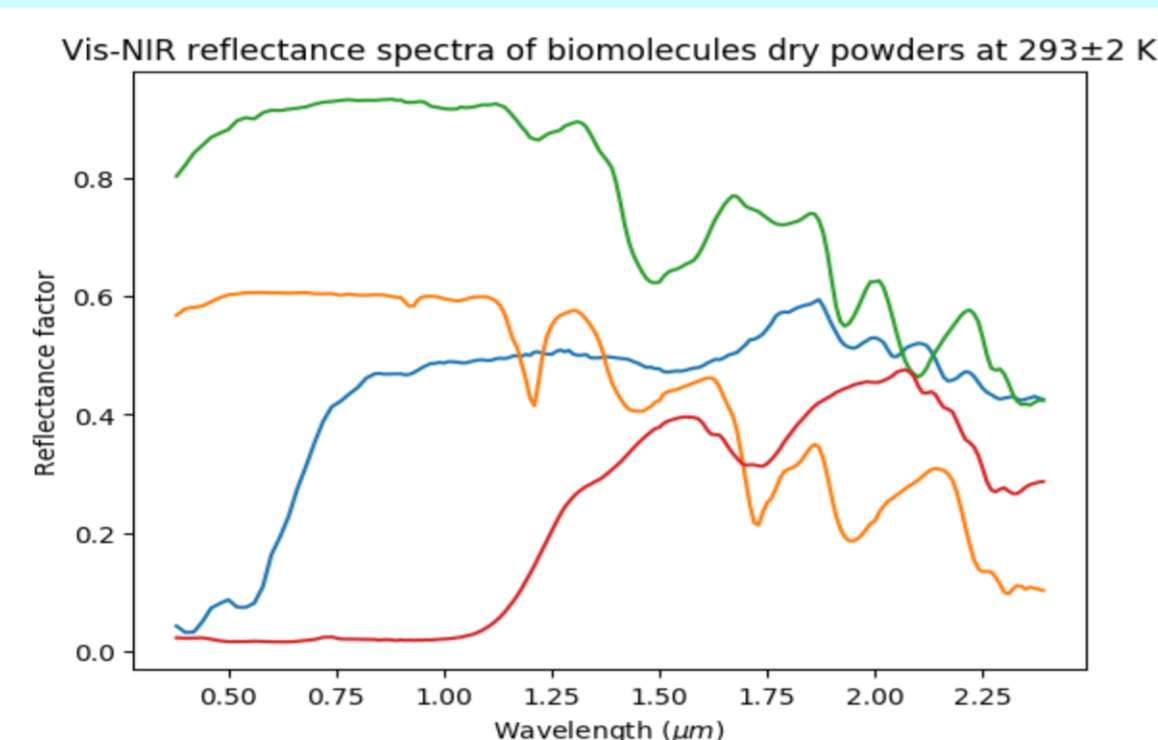
## ACID database

Open University - Astrochemistry group + Physical Research Laboratory + NSRRC  
**Expertise:** VUV spectra of simple inorganic and organic molecules and their mixtures.



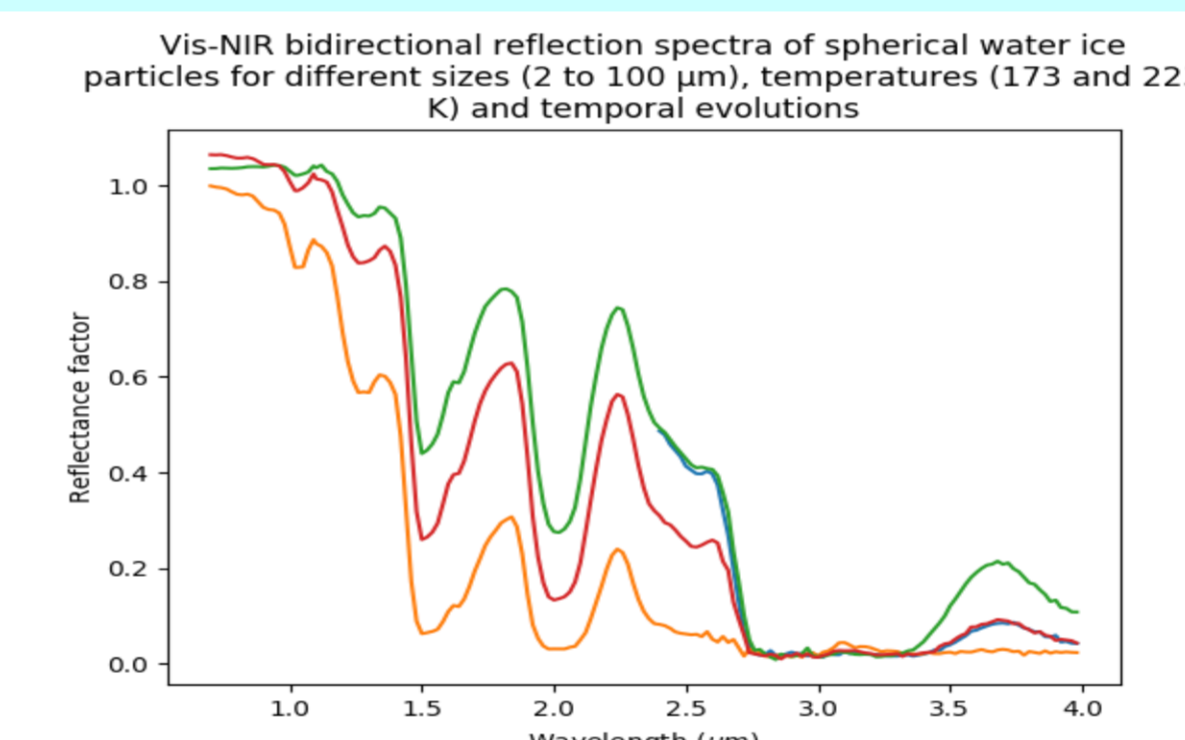
## BYPASS database

Space Research and Planetary Science Division University of Bern (Unibe), Bern  
**Expertise:** reflectance spectroscopy of analogues of planetary or small-bodies surfaces.



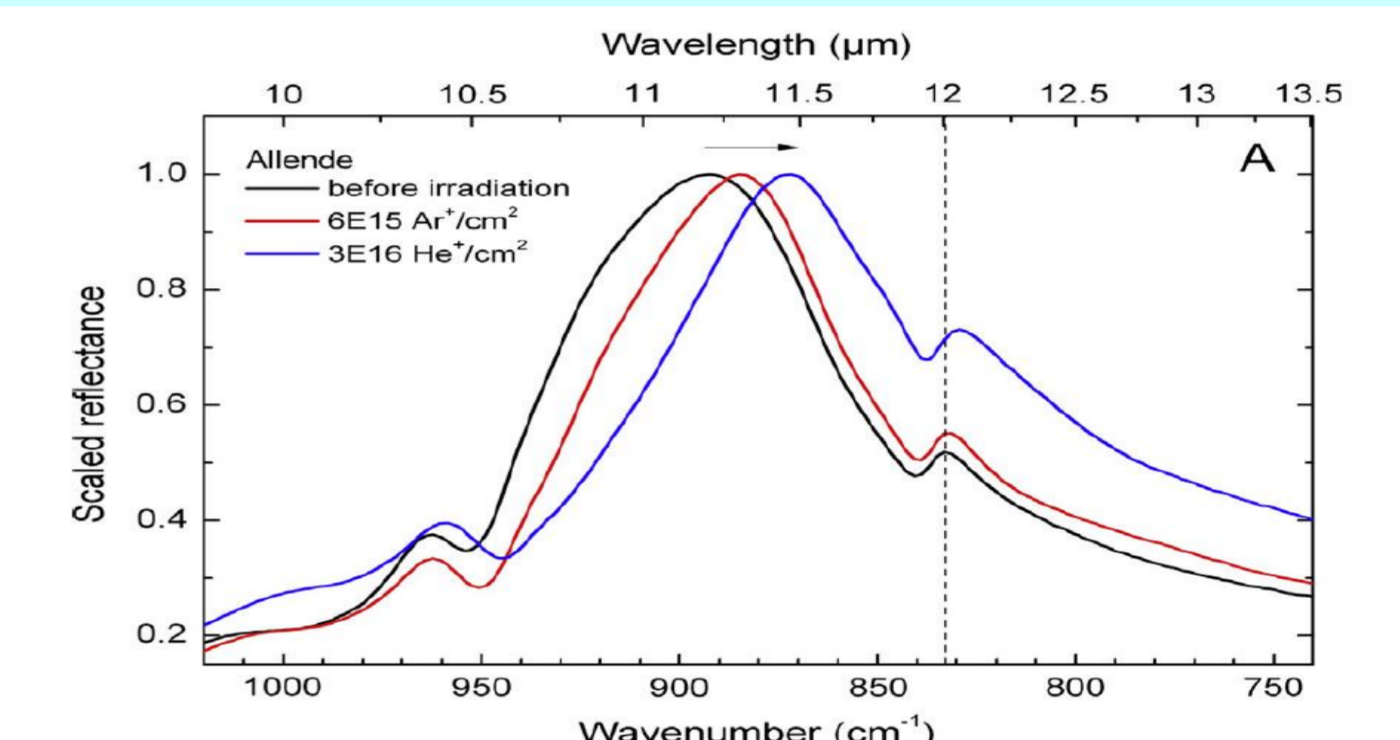
## CSS database

Cold Surfaces Spectroscopy facility database for visiting teams with Europlanet TNA grants  
**Expertise:** spectral data recorded during visits within the Trans-National Access program.



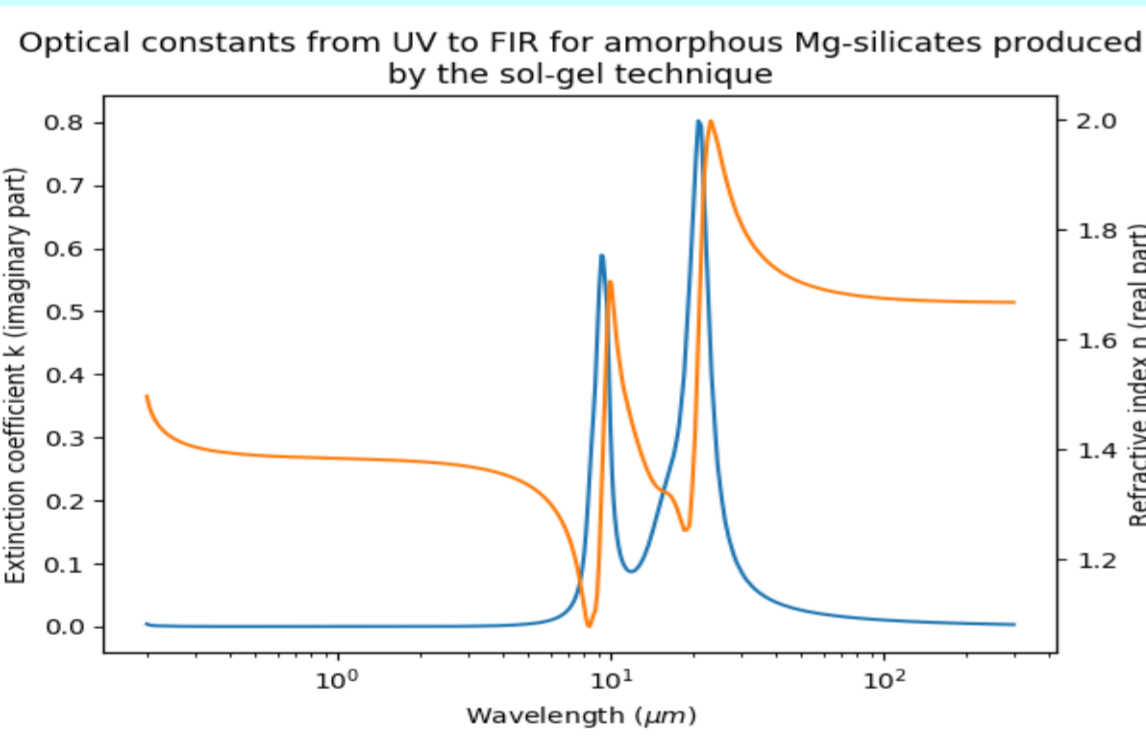
## DAYS database

Institut d'Astrophysique Spatiale - CNRS / Université Paris-Sud, OSUPS, Orsay  
**Expertise:** spectroscopic characterization of solids of planetary and astrophysical interests



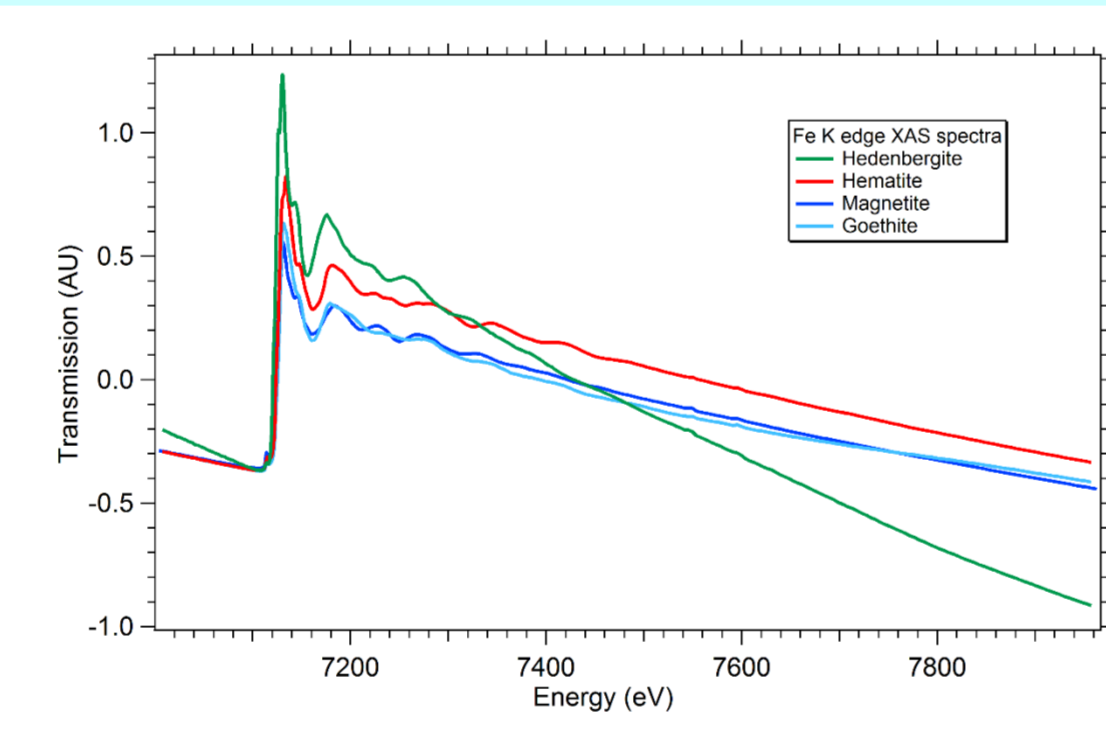
## DOCCD database

AIU Observatory / Laboratory Astrophysics team - Friedrich Schiller University, Jena  
**Expertise:** UV to FIR complex refractive indices of solid materials relevant for cosmic dust.



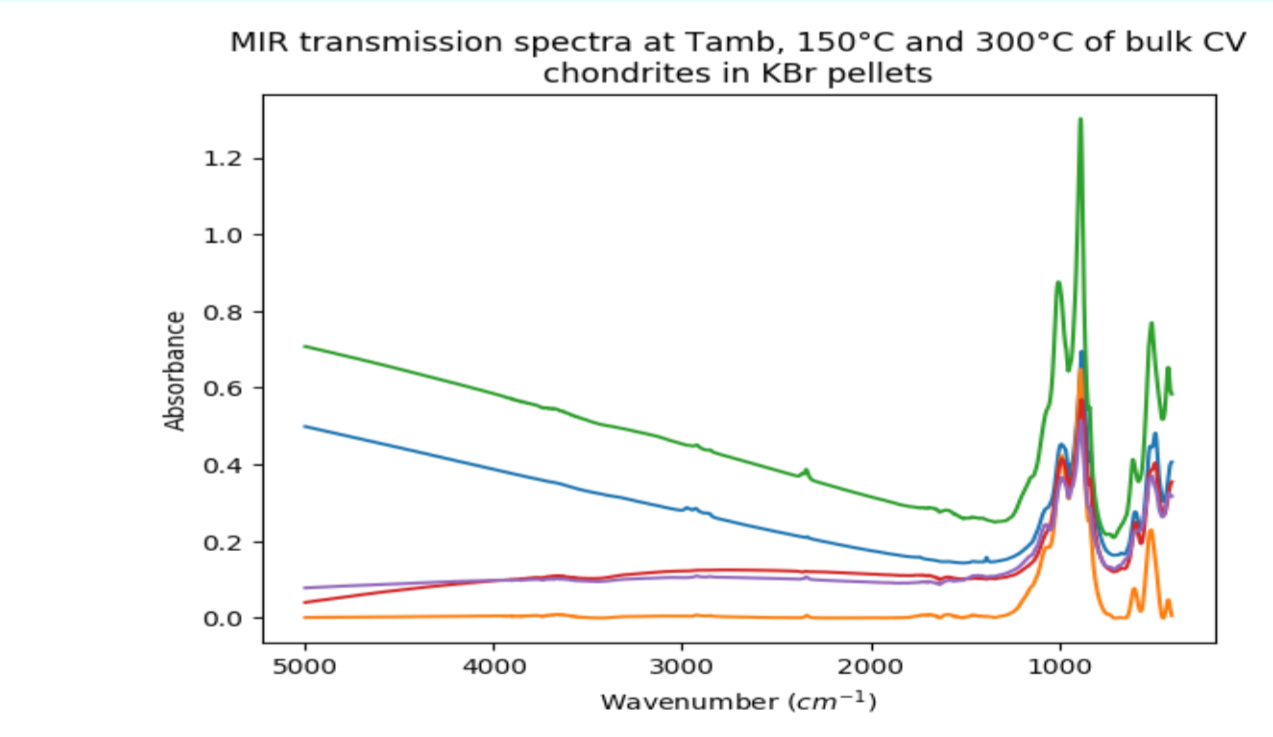
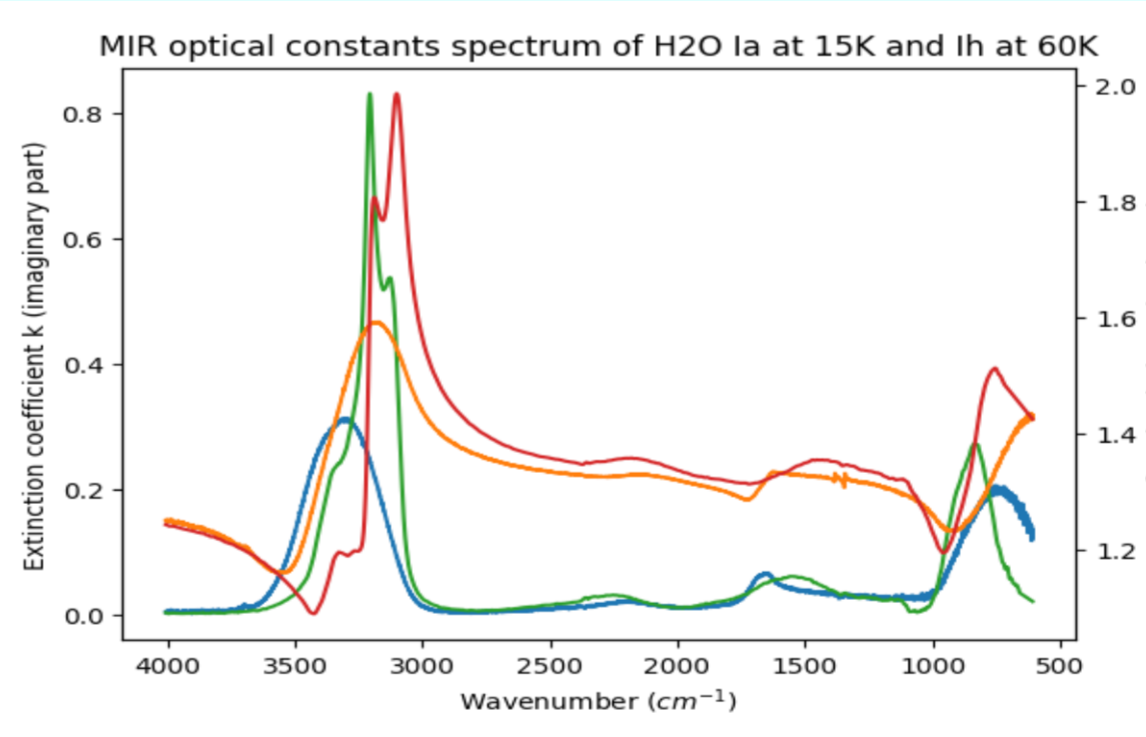
## FAME database

ESRF / FAME line team - Structure d'Exploitation des CRG, OSUG, Grenoble  
**Expertise:** XAS spectra of natural and synthetic minerals, glasses, metals & organic complexes.



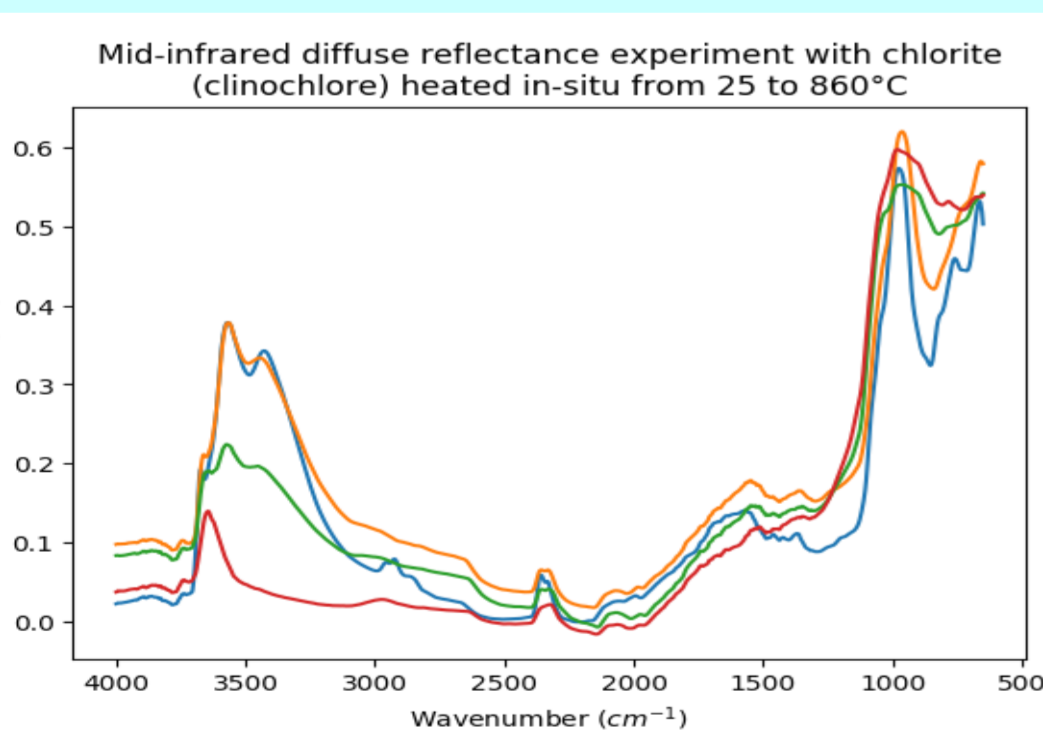
## GhoSST database

IPAG (Planetology team) - CNRS / Université Grenoble Alpes, OSUG, Grenoble  
**Expertise:** spectroscopy of solids of planetary and astrophysical interests: natural and synthetic solid samples with special focuses on low temperature ices & molecular solids, hydrated minerals, organics and carbonaceous materials, and cosmo-materials (meteorites, micro-meteorites & IDPs).



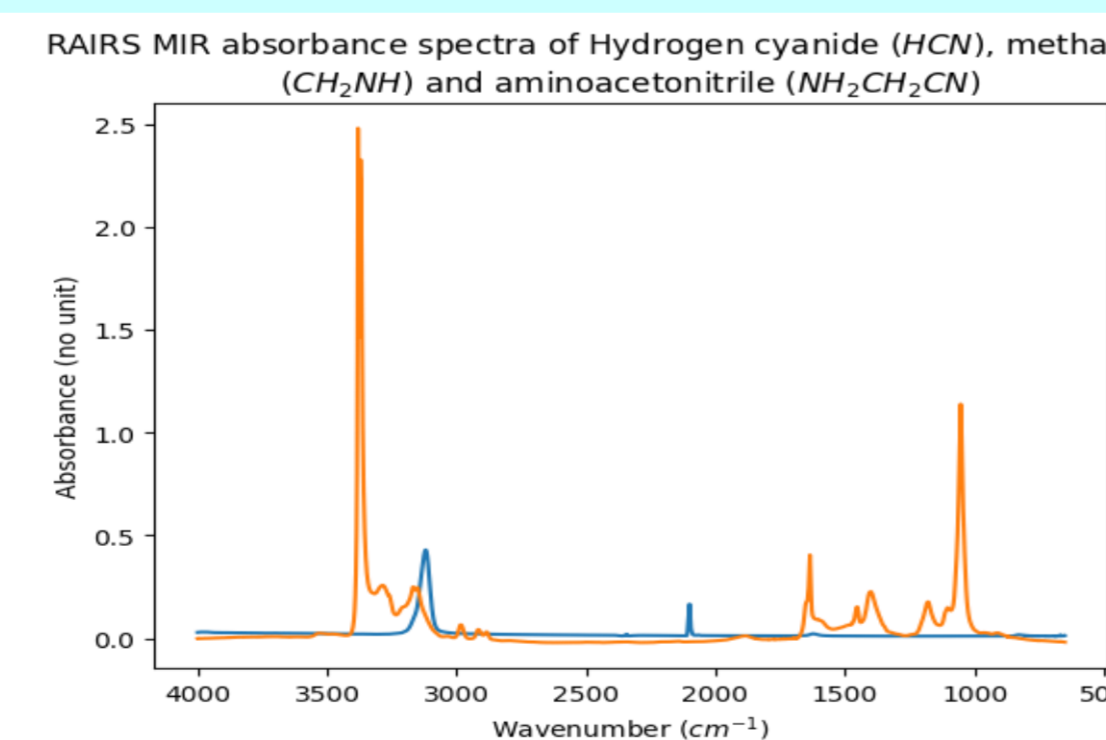
## LSD database

Clay Minerals Laboratory (CML), Polish Academy of Sciences (IGS-PAS), Kraków  
**Expertise:** spectra of layered silicates and other related materials, with emphasis on Mars.



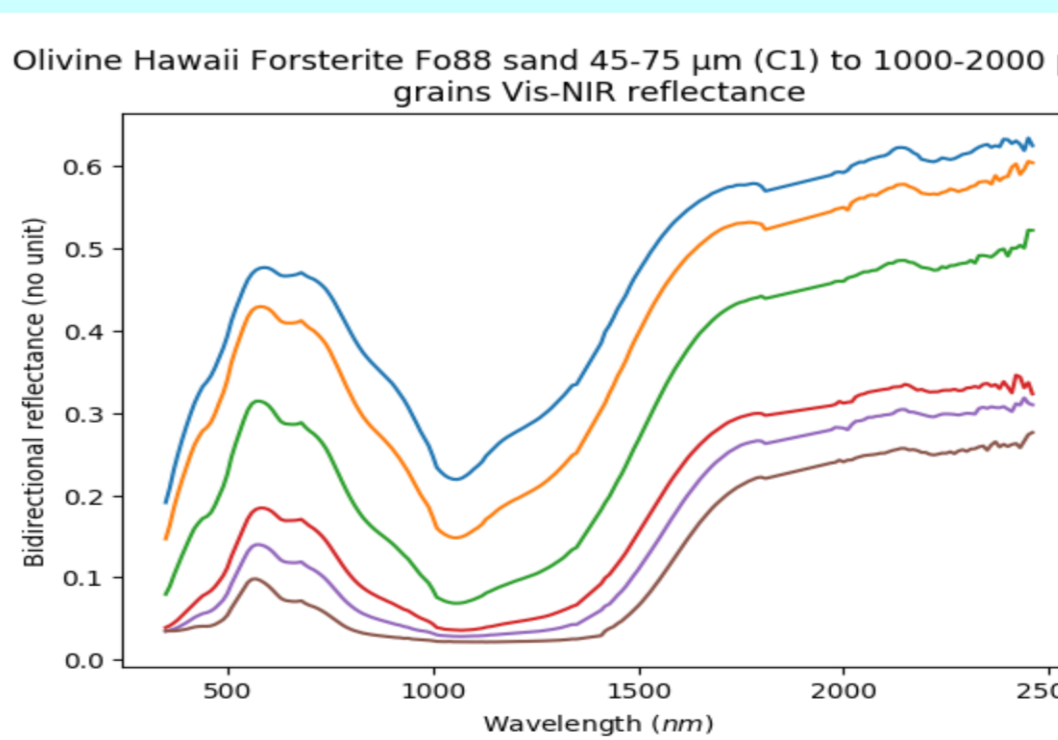
## MIA database

PIIM - CNRS / Université Aix-Marseille, Marseille  
**Expertise:** interstellar analogue spectra of complex organic molecules pure or diluted in H2O



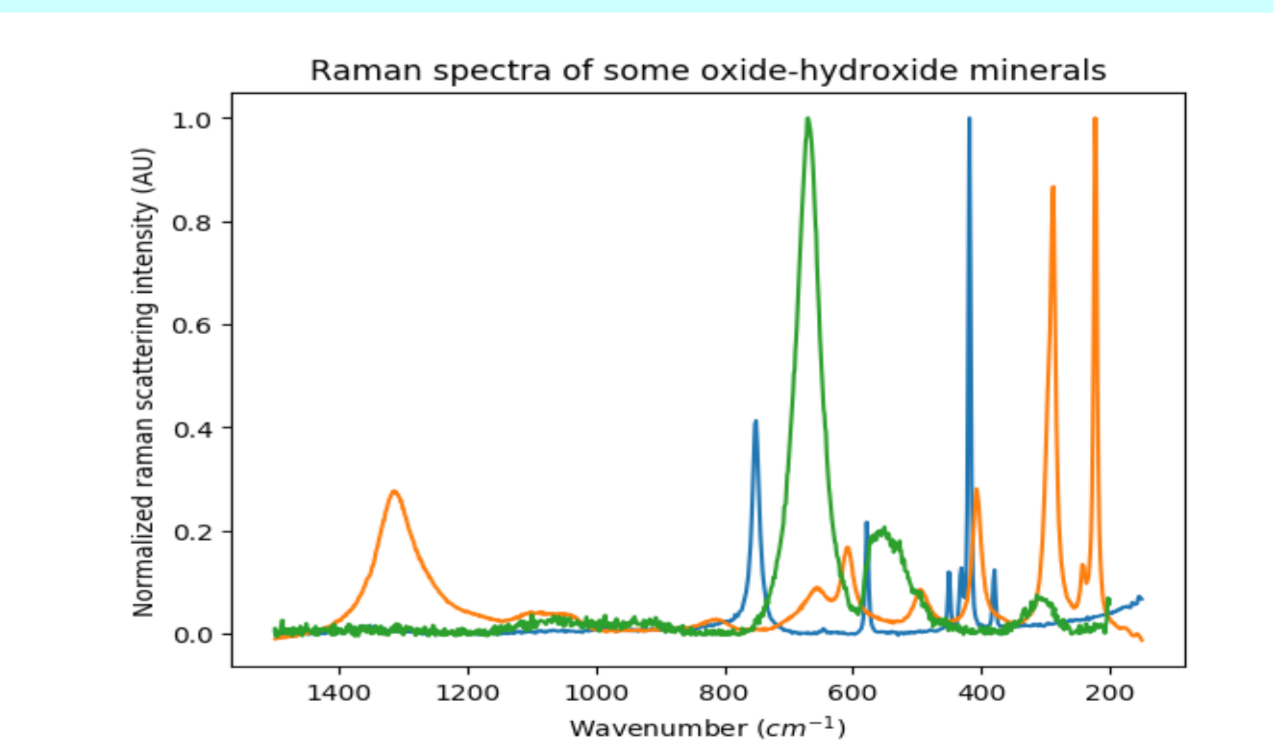
## PaSSTEL database

IRAP (PEPS team) - CNRS / Université Paul Sabatier, OMP, Toulouse  
**Expertise:** Vis-NIR bidirectional reflectance spectra of natural mineral w. controlled grain size.



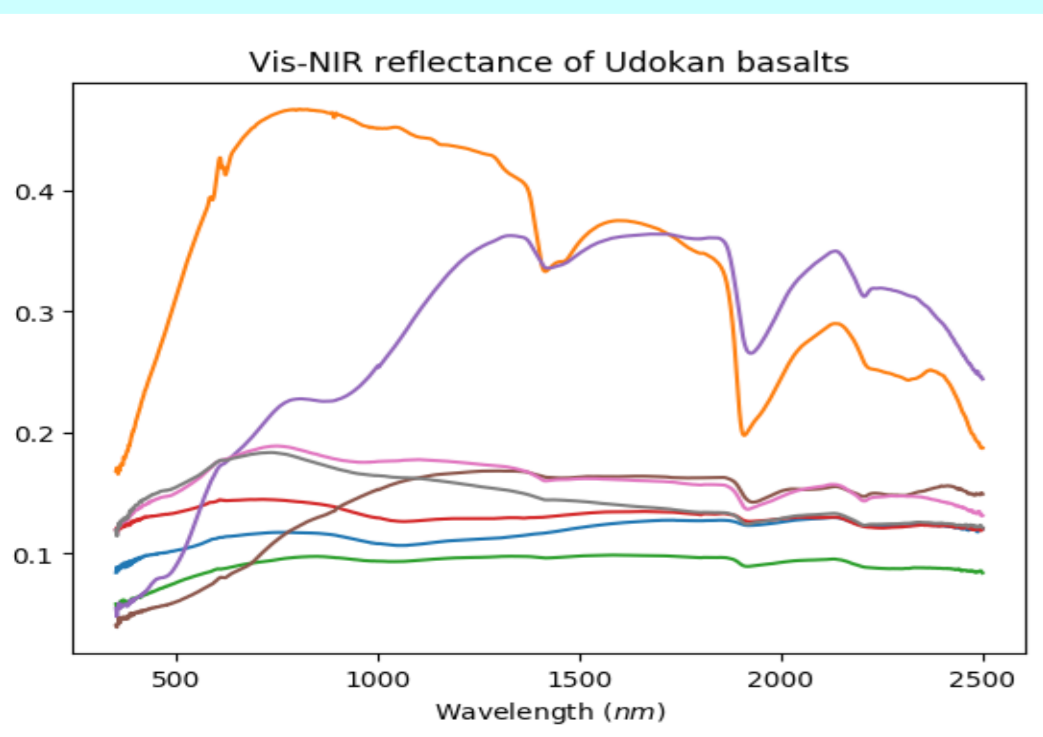
## REAP database

LGL-TPE - CNRS, Université Claude Bernard (UCBL), Obs. de Lyon, Lyon  
**Expertise:** Raman spectra of representative minerals



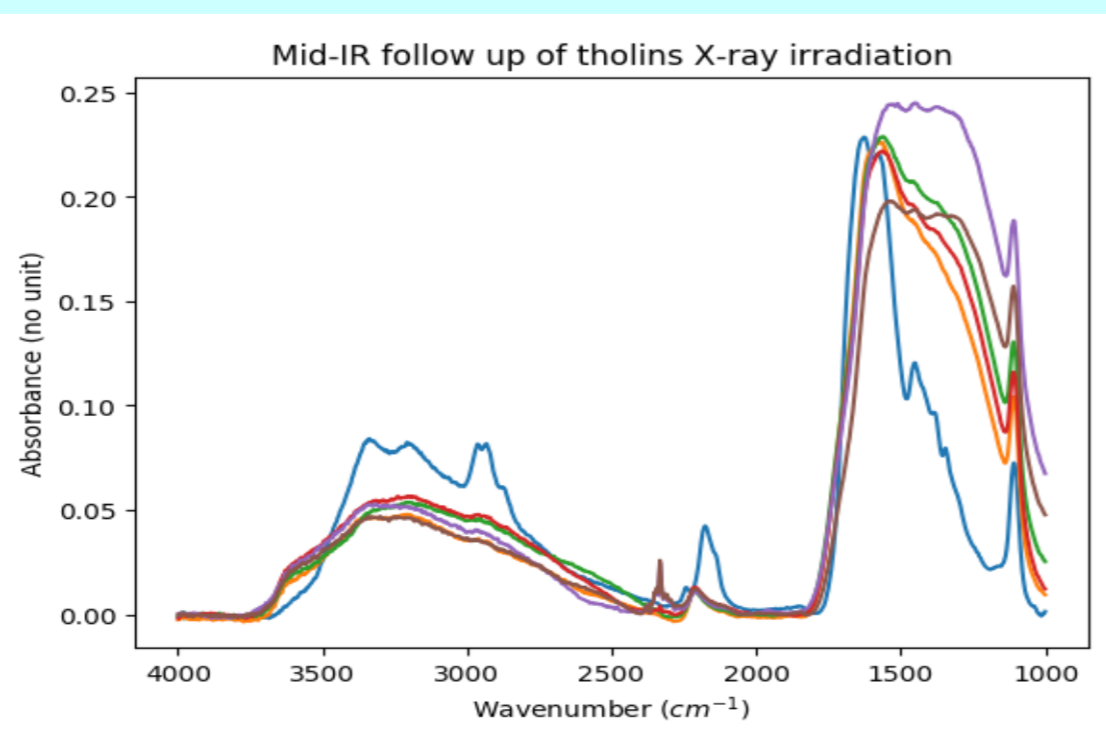
## SOSYPOL database

SSDPG - Polish Academy of Sciences (SRC-PAS), Warsaw  
**Expertise:** spectra of analogue materials of Solar System solid body surfaces (basalts, tholins...).



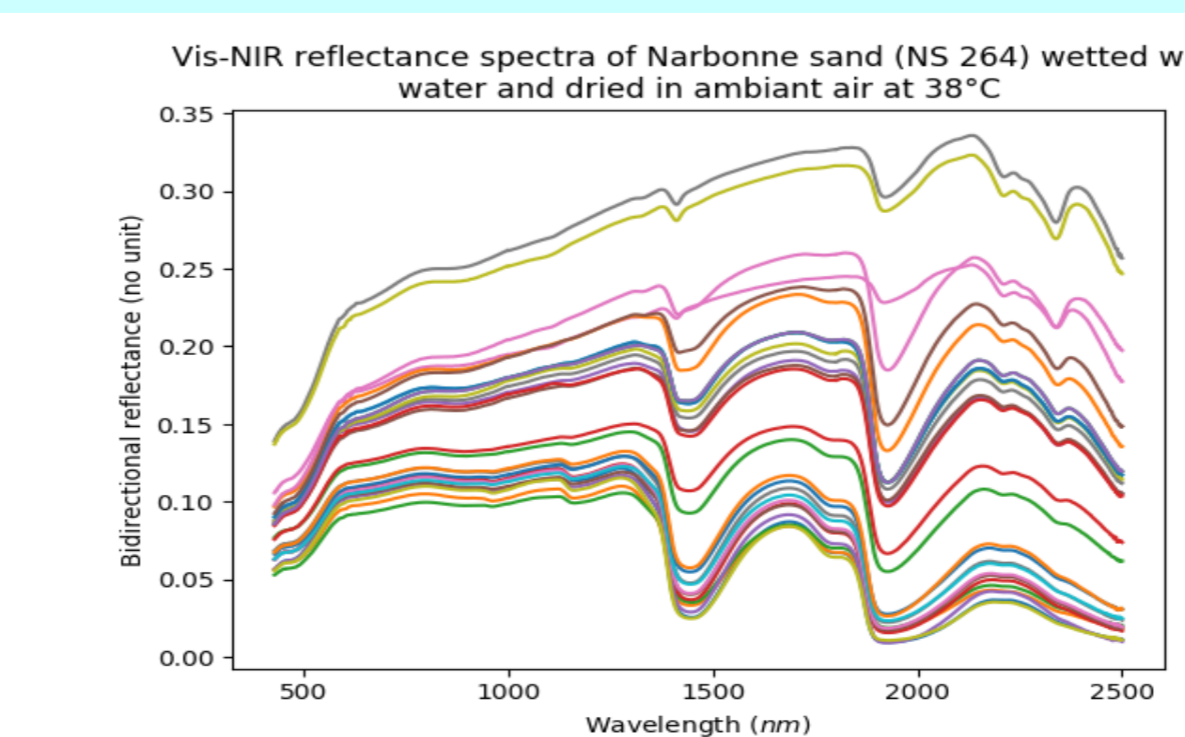
## SPAN database

LATMOS - IPSL, CNRS / UVSQ / UPMC / OVSQ, Guyancourt  
**Expertise:** Vis-IR spectra of laboratory analogues of planetary atmospheric aerosols.



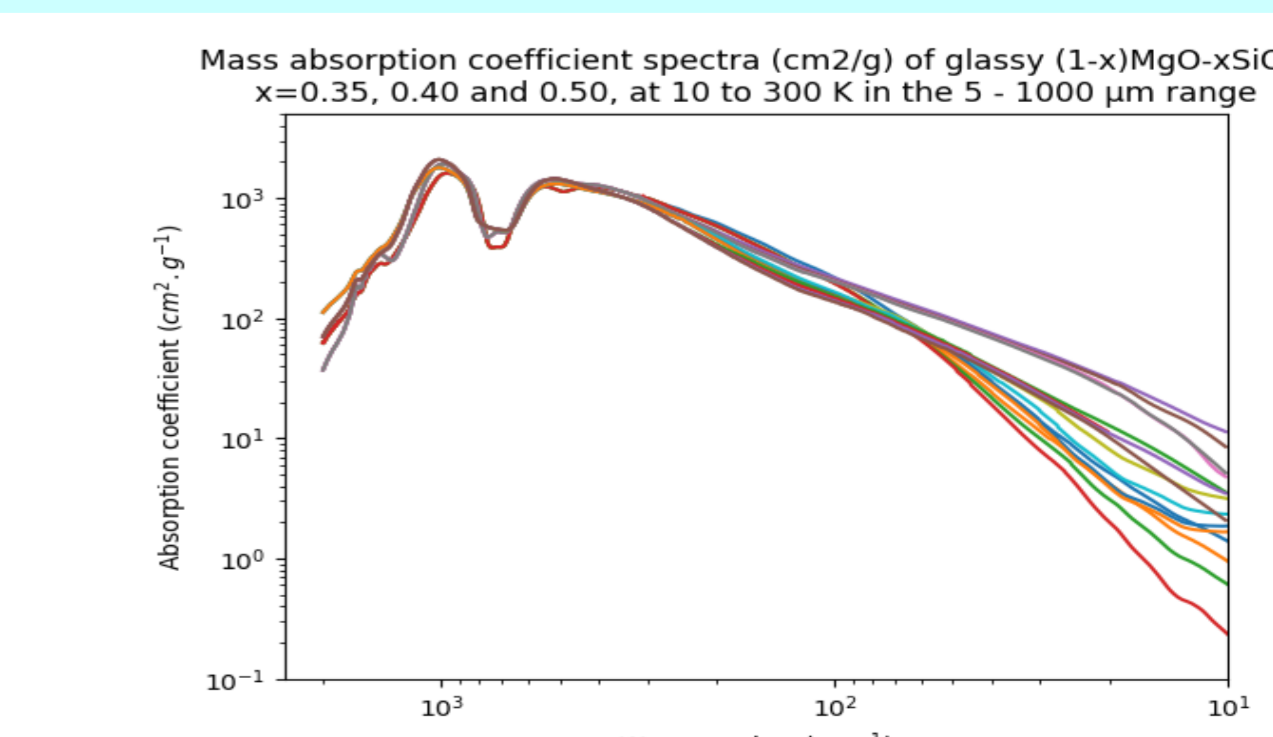
## SSTONE database

LPG-Nantes - CNRS / Université de Nantes, OSUNA, Nantes  
**Expertise:** spectroscopy of minerals and ices of planetary interest: Vis-NIR reflectance, Raman...



## STOPCODA database

IRAP (MICMAC team) - CNRS / Université Paul Sabatier, OMP, Toulouse  
**Expertise:** infrared spectra of cosmic dust analogues at low temperature.



- ✓ **Soon:** 5 more databases (SCOOP, REFL\_SLAB, COMEDA, ISMAD, MTACSFK)
- ✓ **Also:** lot of data in preparation waiting public release... **Stay tuned @ SSHADÉ!**
- ✓ **EPN 2024 (2020-2024):** a dozen new spectral databases + a band list database ...

✓ **SSHADÉ user tutorials for groups / workshops / seminar... :** [contact@sshade.eu](mailto:contact@sshade.eu)

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