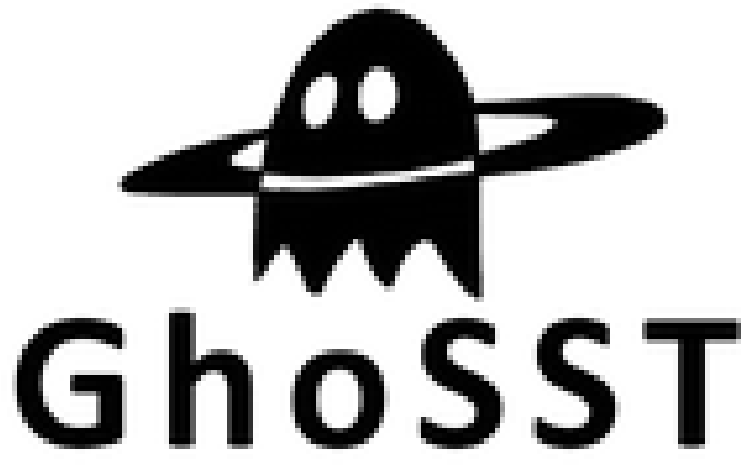


GhoSST: A database of experimental data on UV to FIR spectroscopy of solids of astrophysical interest



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Introduction

Spectroscopy and spectro-imagery are increasingly used in space missions, in orbit or in situ, to study the solid phase of the small objects of the solar system (e.g. VIMS/Cassini, DISR/Huygens, VIRTIS/Rosetta, Deep Impact/EPOXI, New Horizons, ...): icy, mineral or organic surfaces and grains, dust particles, aerosols, etc. On the other hand **infrared, Raman and fluorescence micro-spectroscopies** are used to study meteorites and cometary dusts in the laboratory and are also on board some space missions for in situ measurements. A major contribution to the analysis of these remote and in situ observations is the **measurement in the laboratory of UV, Visible and IR spectra of a variety of materials** (ices, minerals, organics, ...) expected to be present at the surface of small bodies of the solar system or in their ejected grains (e.g. comets, asteroids, TNO, icy satellites, ...).

Solid spectroscopy data at IPAG

At Institut de Planétologie et Astrophysique de Grenoble we performed numerous **experiments** during these last 23 years **on various types of materials** (ices, minerals, organic and carbonaceous materials, sulfur compounds, meteorites, IDPs, etc.) **under variable conditions** (e.g., temperature, phase, adsorption, irradiation) **with various techniques** (macro and micro-transmission spectroscopy, bidirectional reflection spectroscopy, Raman and fluorescence spectroscopy, ATR, etc.). Thus 6 years ago, we decided to develop a database to make all these data easily available to the community

Solid planetary materials

- Ices, hydrates, clathrates, ... + irradiation
- Organic solids: simple, macromolecular materials, polymers, ...
- Rocks, minerals, salts, hydrated materials, adsorption, ...
- Other compounds (sulphur compounds, ...) + irradiation
- Natural and extra-terrestrial samples (meteorites, IDP's, Stardust, ...)

Different physical and textural states

- Compact (rocks, ice, ...), powder (minerals, snow, ...)
- Thin films, individual grains, monocrystals, polished section, mixtures, ...
- Temperature : 10 to 700K Pressure: 10⁻⁹ mb to several bars

SSDM: Solid Spectroscopy Data Model

No solid spectroscopy data model covering a wide range of solids and spectroscopy techniques currently exists, contrary to gas spectroscopy. We thus defined an unique data model to best fit the purposes of the whole solid spectroscopy community. **SSDM has four major modules** to describe solid **samples, experiments and instruments, spectroscopic data** and **band list data**. The spectral range considered is from UV to sub-mm wavelengths. All types of optical spectroscopies are considered.

GhoSST Database

In the frame of both VAMDC and the EUROPLANET RI European programs we are developing a database for laboratory spectroscopy of solids: **GhoSST** ("Grenoble Astrophysics and Planetology Solid Spectroscopy and Thermodynamics")

<http://ghosst.obs.ujf-grenoble.fr>

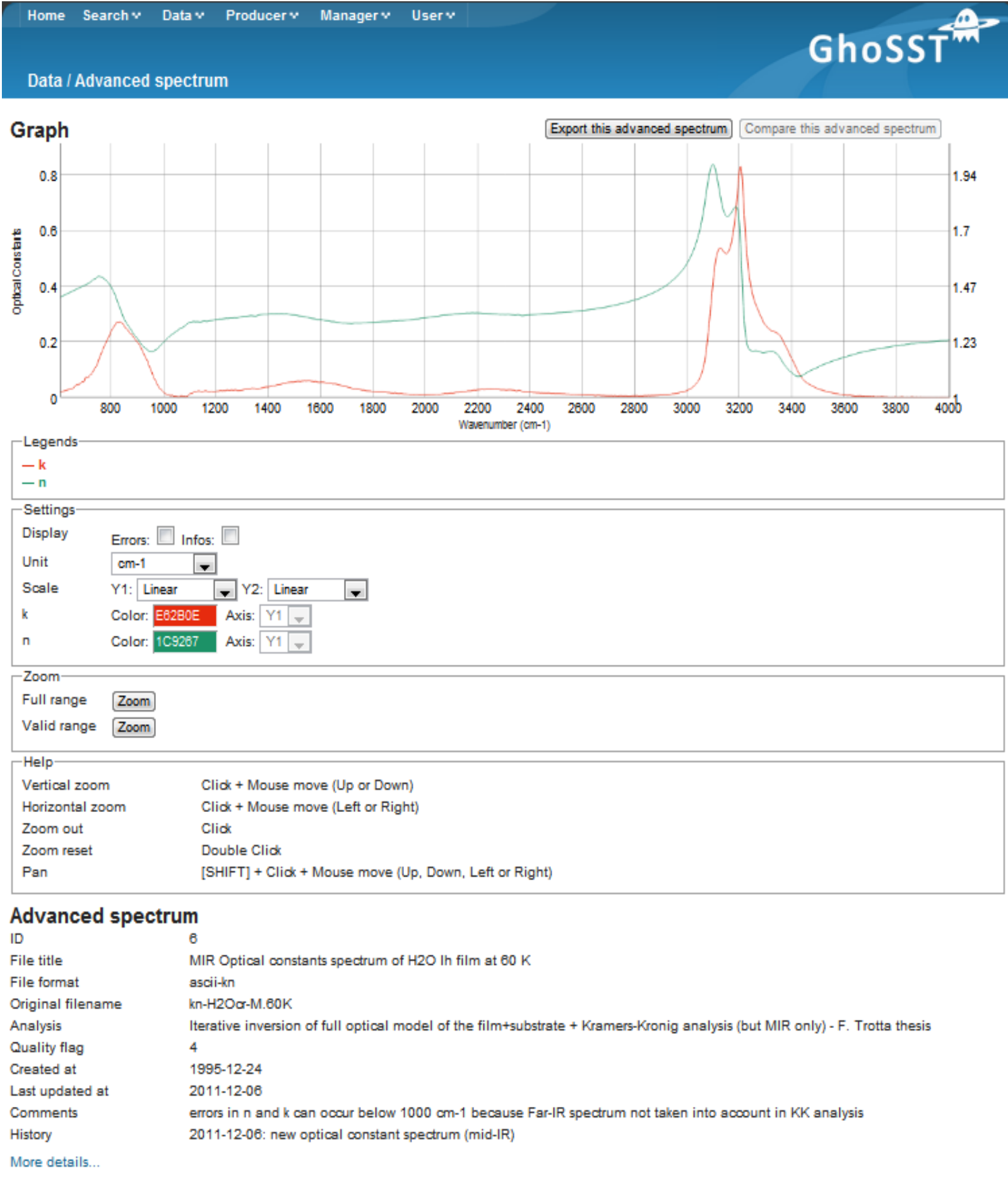
The **GhoSST** relational database infrastructure is based on SSDM, in order to describe accurately the solid samples, the experiments, the spectra and their products. It will be also partly searchable from any Virtual Observatory (e.g. VAMDC, IDIS/europlanet ...).

User web interface of GhoSST: it provides 2 types of guided step-by-step search and an advanced **search tools** allowing to interrogate up to 25 different keywords about the sample, its constitutive materials, constituents and species, its properties, type of instrument/technique, spectral range, type of spectra. Tools allow **interactive spectra visualization** and provide **detailed information**, as well as data **download options**. A **"band list" search** interface is under development. It will allow users to find all bands of a chosen species in one well-defined constituent (e.g. pure ice, clathrate, mixture)

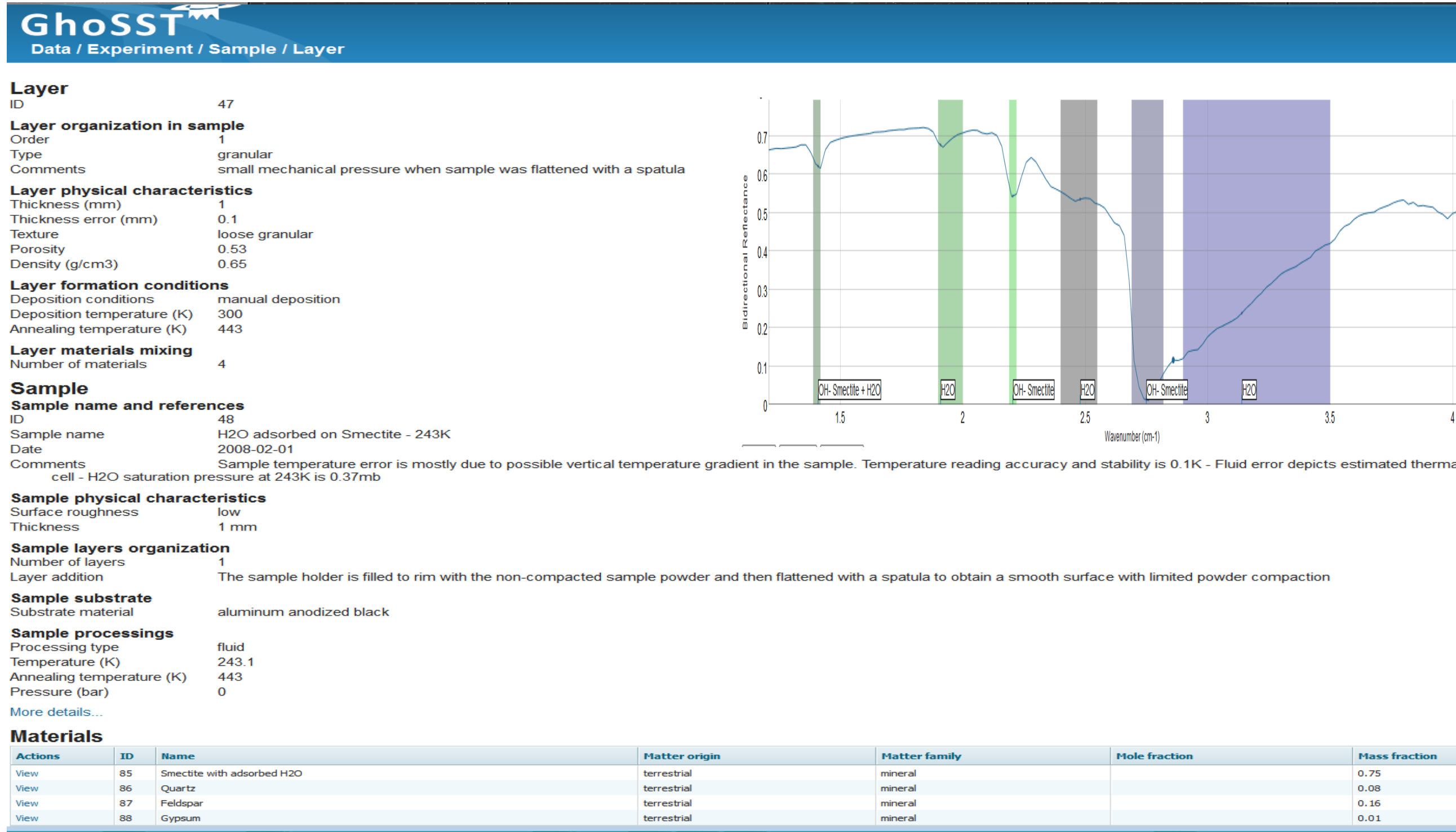
Web-based interface: Data search, visualization, export, history, ...

Searching data : beginner & expert modes

Browsing and visualization of search results...



Looking at detailed information on sample, experiment, spectra, references



Data delivery through mail or FTP...

The GhoSST database starts its on-line public access on 25 September 2012. ☺ ☺ ☺

Development will continue by mostly adding the possibility to include spectra of cosmomaterials (meteorites, IDPs, ...) as well as a band-list data base connected to spectra. **Data feeding** is at its very beginning and will first focus on spectra with Comets, Asteroids, Mars and Pluto/TNO interests.

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