

Last developments of GhoSST and its Solid Spectroscopy Data Model - The SSHADE project

B. Schmitt, D. Albert, P. Bollard, L. Bonal, M. Gorbacheva, P. Beck, E. Quirico and the SSDM expert working group
Institut de Planétologie et Astrophysique de Grenoble (IPAG), UJF-Grenoble 1 / CNRS-INSU, Grenoble, France
(Bernard.Schmitt@obs.ujf-grenoble.fr).

Abstract

GhoSST is a database that started to provide to the community a large number of spectra of solids (ices, minerals, organics, meteorites...) of astrophysical interests in the UV to far-IR range. The *GhoSST* database (<http://ghosst.osug.fr/> - beta version) is on-line since 25 September 2012 with about 300 spectra and products. Its most recent evolutions are the implementation of a band list data base of molecular solids and molecules ab/adsorbed on all types of solids, and the development of data models of meteorite samples and organic matters. A project (SSHADE) to extend this infrastructure for hosting solid spectroscopy data from other laboratories is under study.

1. 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, New Horizons, ...): icy, mineral or organic surfaces and grains, dust particles, aerosols, etc. Infrared, Raman and fluorescence micro-spectroscopies are used to study meteorites and cometary dusts in the laboratory and onboard some space missions for *in situ* measurements. A major contribution to the analysis of these 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, ...).

However generally the first information a planetary scientist would like to know when (s)he has a surface/aerosols/grains spectrum with absorption bands is to know which solid absorb in this wavelength range. A band list database is thus needed.

Infrared and Raman spectra of meteorites and their organic extracts are of prime importance for the understanding of the composition of the organic matter they contain as well as for the interpretation of the surface of asteroids and other small bodies. It is also the case of several other types of natural or synthetic organic matters of planetary interest such as Tholins (organic solids formed by irradiation of CH₄:N₂ gas mixtures). Their inclusion in GhoSST was thus a priority.

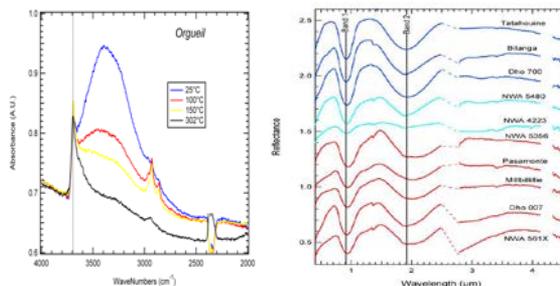


Figure 1: Spectra of meteorites dried under vacuum (left); NIR spectra of Eucrites and Diogenites (right).

2. Recent developments of SSDM

The Solid Spectroscopy Data Model (SSDM) has been first extended in order to allow to include in GhoSST a bandlist database which provides individual information on each vibration bands of one particular isotopic species inside a constituent in a given phase and physical conditions.

SSDM has then been developed in order to be able to describe samples made of meteorites and their extracted constituents such as IOM (Insoluble Organic Matter), SOM (Soluble Organic Matter), ... For this it was necessary to develop a module describing the meteorite object (name, type, general properties) and a module to describe the meteorite matter (part of the meteorite: raw or processed) from which the sample is made.

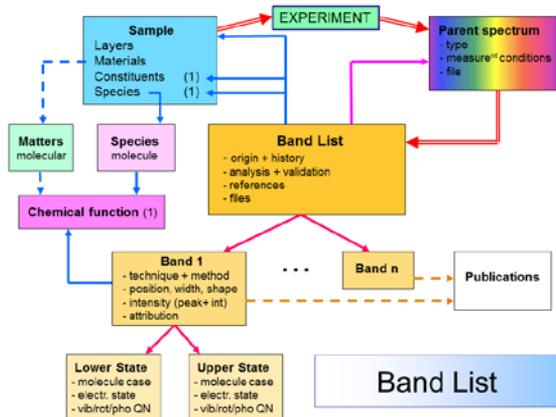


Figure 2: Structure of band list datamodel in SSDM

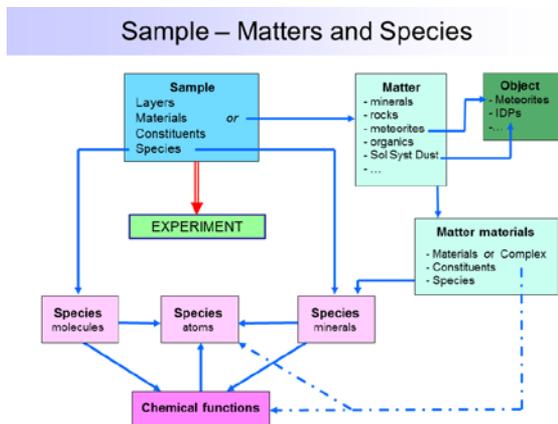


Figure 3: Structure of band list datamodel in SSDM

3. SSHADE infrastructure

GhoSST is the first implementation of SSHADE (“Solid Spectroscopy Hosting Architecture of Databases and Expertise”), a project of database infrastructure. Its aim is to provide to the European community a software infrastructure for the hosting of data bases of solid spectroscopy. This infrastructure will offer a set of data bases, a search engine and a common web interface. The hosting will be at the OSUG Data Center in Grenoble.

The SSHADE project was boosted by INSU/CNRS who asked us to develop a “thematic pole on planetary solids” within the new framework of observation services of INSU. This project is just starting this year. A few meetings at French and European levels are planned to define the frame of its development.

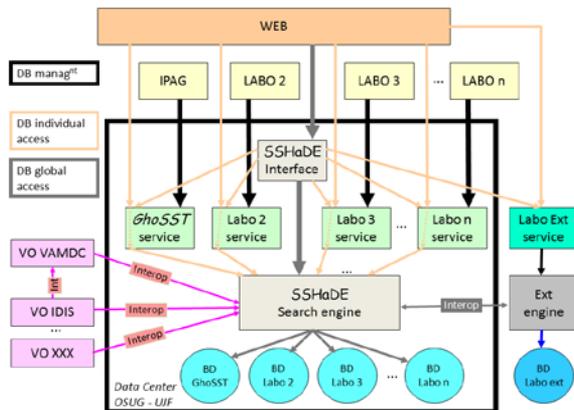


Figure 4: Schematic structure of SSHADE infrastructure

Acknowledgements

We acknowledge the Europlanet RI and VAMDC programs, OSUG, the French PNP and PCMI programs, ASOV and CNES for financial supports.