SSHADE Users newsletter – June 2025

## Focus on high-temperature and high-pressure spectroscopy

Dear SSHADE users,

This month, we highlight one of the most powerful features of SSHADE: its ability to provide spectral data acquired under extreme conditions, including high pressures and temperatures. These measurements are essential for simulating environments deep within planets, during hydrothermal activity, or on hot planetary surfaces. SSHADE hosts hundreds of spectra of materials (natural and synthetic) recorded at elevated pressures and temperatures, across various spectral domains (IR, Raman, UV-Vis…).

Why do we need spectra acquired under extreme conditions? Spectral features can shift, broaden, or even disappear when conditions change, meaning standard room-temperature data may not accurately represent a material's behavior in situ on a planet, moon, or exoplanet. Access to pressure/temperature-resolved data is crucial when modeling planetary interiors, volcanic processes, or fluid-rock interactions.

Some examples available in SSHADE:

- **Near-infrared reflectance spectra of planetary analogues** measured up to 673 K allow the analysis of temperature-induced shifts in diagnostic absorption bands, supporting more accurate planetary surface mapping in the NIR range.
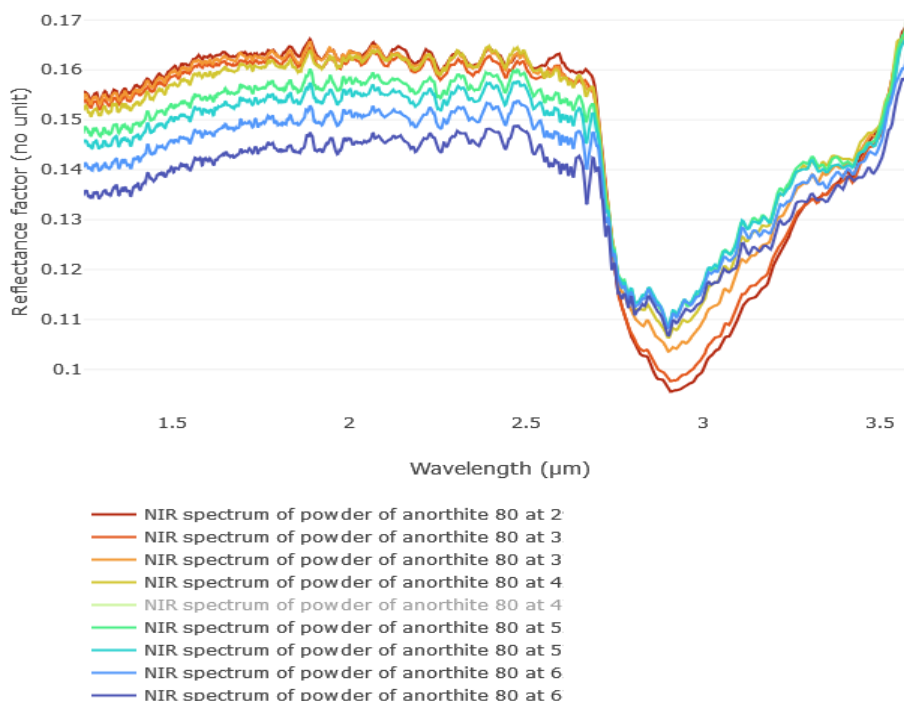

- **Mid-infrared diffuse reflectance experiment of chlorite** heated up to 1000K
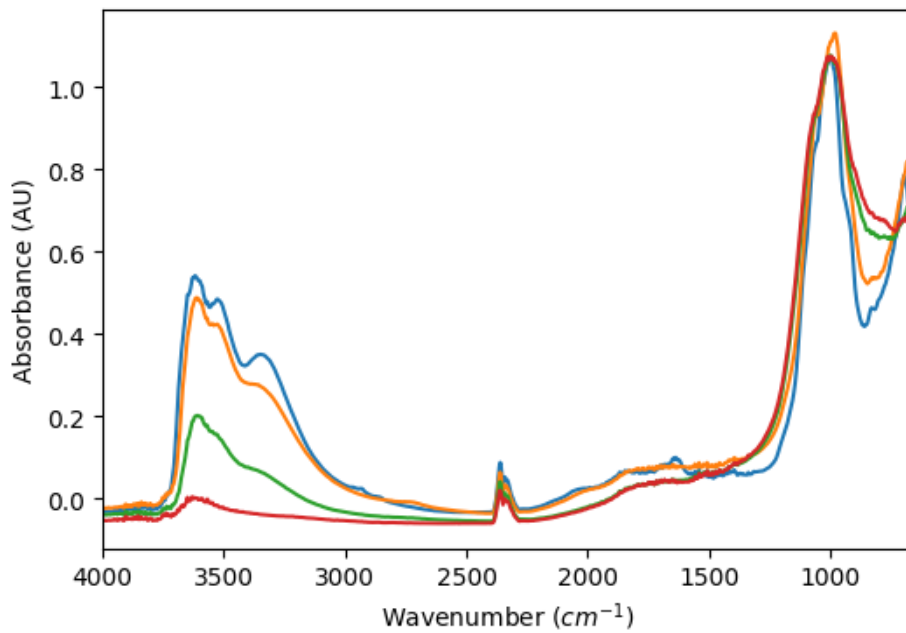
MIR DRIFT spectrum of donbassite at 25°C
MIR DRIFT spectrum of donbassite at 500°C
MIR DRIFT spectrum of donbassite at 600°C
MIR DRIFT spectrum of donbassite at 650°C

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- [Cu K-edge XAS spectra](#) of copper-bearing hydrothermal fluids measured up to 500 bars and 450 °C enable the investigation of copper speciation and coordination environments under deep-Earth or Martian crust-like high-pressure conditions.
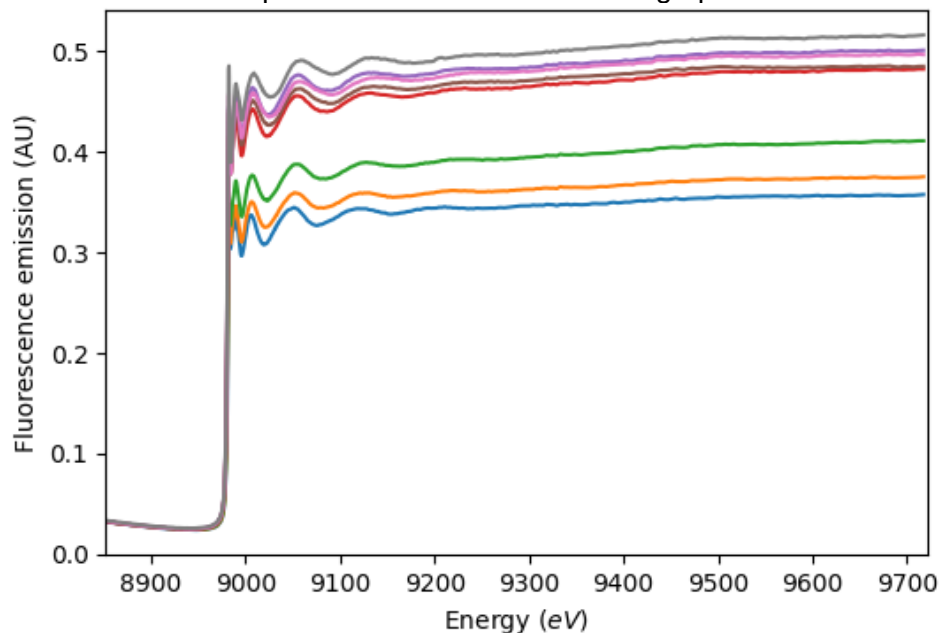
Cu K edge XAS fluorescence of copper(I) solution at hydrothermal conditions at 600 bar and 25°C

Cu K edge XAS fluorescence of copper(I) solution at hydrothermal conditions at 600 bar and 100°C

Cu K edge XAS fluorescence of copper(I) solution at hydrothermal conditions at 600 bar and 150°C

How to find more data with peculiar measurement conditions? To explore spectra acquired under extreme conditions, you can use a set of 'spectra search' filters grouped in the "By environment" tab. You can select the unit in which you want to enter your min/max values. You can also combine the pressure or temperature range with additional filters on material type, spectrum type, or wavelength range for fine-tuned results.

We appreciate your continued support and engagement with SSHADE. Your feedback is precious to us! If you have suggestions on what type of data you'd like to see more of, or if you have general feedback on SSHADE, please don't hesitate to reach out at *contact@sshade.eu*. Stay tuned for future data.

Have fun with SSHADE data!

The SSHADE Team

All previous user newsletters are stored in the dedicated 'News' page of the SSHADE Wiki