

SSHADE Users Newsletter – July 2024 –

Raman band list of carbonates

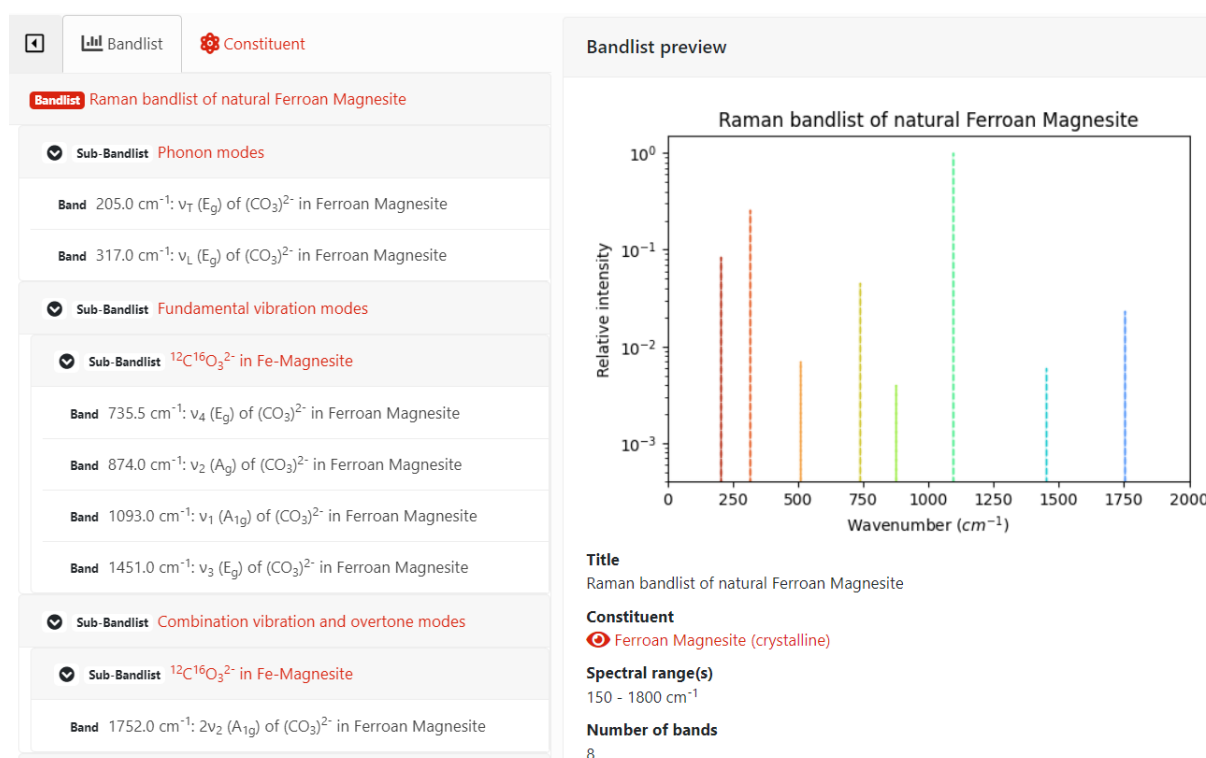
Dear SSHADE users,

Today, we would like to present the **Raman band lists for carbonates** available in the SSHADE database. These band lists provide robust spectral information that is invaluable for a wide range of research applications, from geological studies on Earth to planetary exploration.

Composed of carbonate ions $(\text{CO}_3)^{2-}$, these minerals are prevalent in various geological formations on Earth and other planetary bodies, such as Mars, asteroids.... They are important indicators of past water presence and climatic conditions, making them essential for understanding planetary evolution and environmental history.

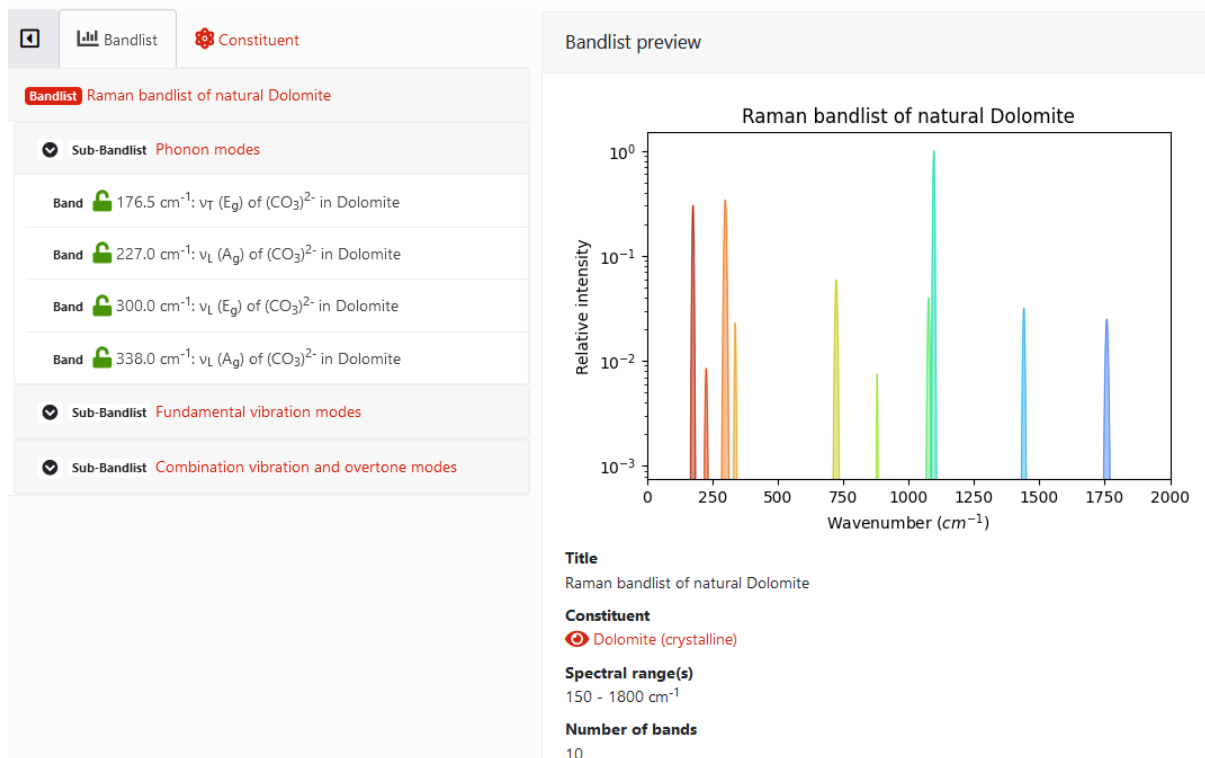
We started a dedicated effort to provide an extensive set of band list data of carbonates by compiling (almost-)all publications on the Raman and infrared spectra of these carbonates and reanalyzing some e-published spectra (RRUFF, ...) as well as a series of new measurements we performed at ENS-Lyon and ISTERre labs. Currently, **SSHADE offers 33 Raman band lists for carbonates**, covering a diverse array of composition. These band lists provide comprehensive spectral data, including band parameters such as position, width, intensity, and vibration modes. In addition to the “endmembers” minerals we are also developing specific band lists for the solid solution, such as for ferroan dolomite or ferroan magnesite ($\text{Fe} > 0.05$).

Examples of applications include the [Raman bandlist of natural Ferroan Magnesite](#), relevant for Martian geology:

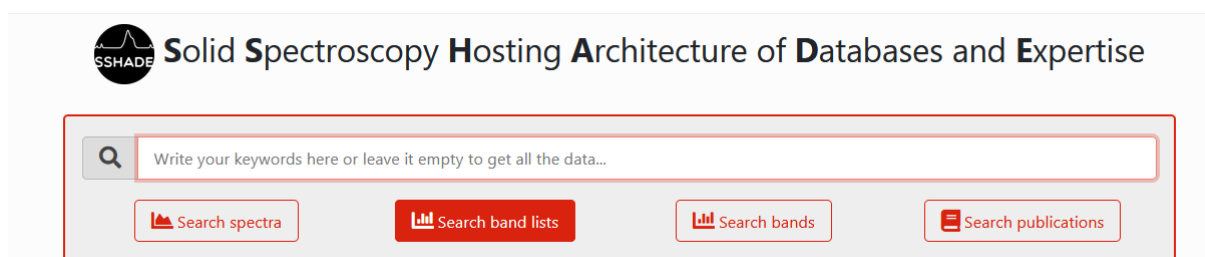


Another example that may interest specialists in primitive bodies of our solar system concern the return to Earth of grains from the Hayabusa 2 mission. Their analysis has highlighted the

presence of 3 types of carbonates on Ryugu (calcite, dolomite, ferroan-magnesite (breunnerite)), which are evidence of varying degrees of aqueous alteration. You can also find in SSHADE the [Raman bandlist of natural Dolomite](#)



To explore these resources, simply navigate through the band list search tool on SSHADE. Its filters allow you to search by specific carbonate minerals or spectral parameters. **If you know one, two or three band positions of your sample** with some good accuracy (better than a few cm^{-1}) **you can unambiguously identify your carbonate mineral** within those already in the database. Once more data on band lists is available, this tool should prove much more effective and accurate in identifying carbonates than conventional methods of correlating the baseline-corrected spectrum with spectra in the database (as in RRUFF and many Raman spectra analysis softwares).



You can then visualize the bandlist spectrum (or one of its linked measured spectrum, if available), analyze band characteristics in detail and export the data.

Whether you are studying planetary geology, conducting environmental research, or exploring the origins of life, the Raman band lists for carbonates on SSHADE offer essential resources to advance your research. Visit SSHADE now to explore these band lists and discover how they can enhance your studies. In the coming months a new series of carbonate band lists will be added to make this tool even more efficient.

Have fun with SSHADE data and stay tuned for future data and user tools.

The SSHADE Team

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