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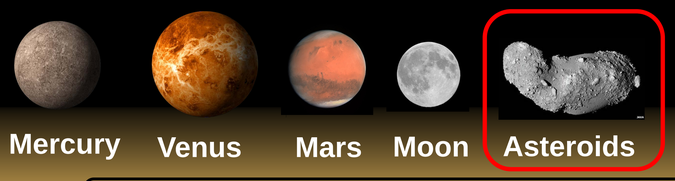
TIR Emissivity Spectra of Thermally Processed Sulfates, Carbonates and Phyllosilicates as Analog Materials for Asteroid Surfaces



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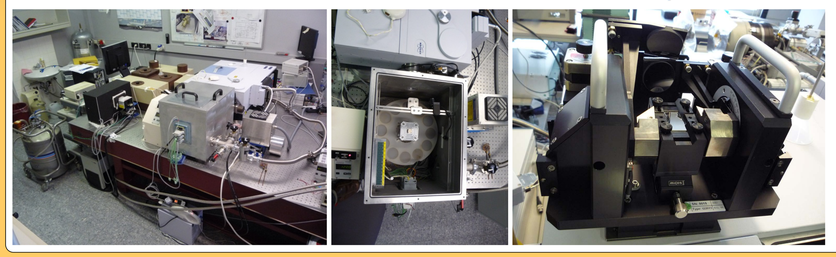
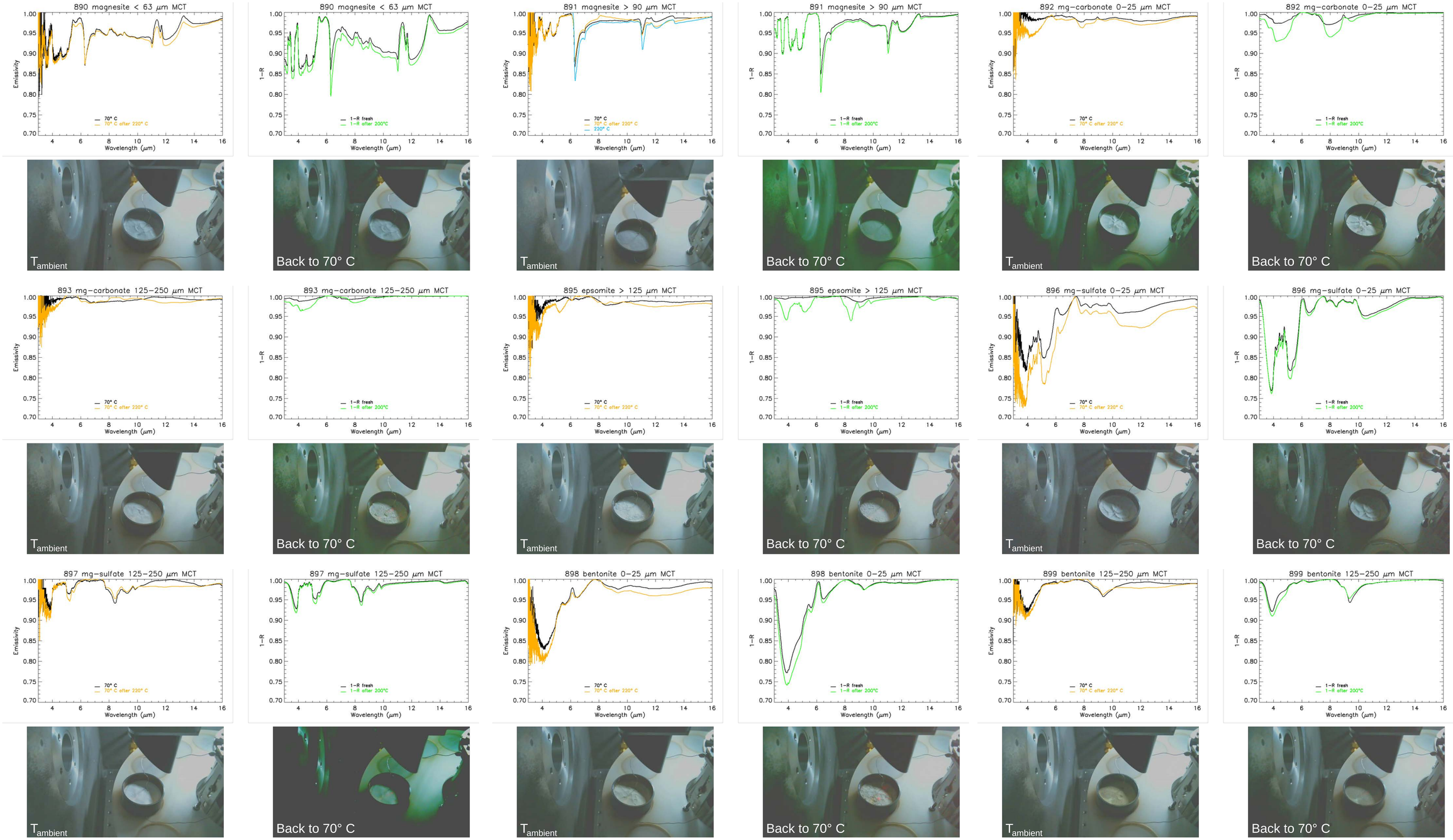
Experimental set-up and samples at the Planetary Emissivity Laboratory (PEL)



We present here new measurements on sulfates, carbonates, and phyllosilicates in various grain size ranges. The setup was configured to simulate the thermal history of surface minerals on the asteroid 2008 EV5 during its revolution around the Sun. This asteroid is the scientific target of the ESA Marco Polo-R mission.

The samples in vacuum (< 0.8 mbar) are measured at surface temperature around 70° C, then the same samples are heated to 220° C, and maintained at this temperature for one hour. Slowly the sample temperature is reduced back again to 70° C and a second measurement is taken. Emissivity spectra before and after thermal processing of the samples are complemented with reflectance measurements on fresh samples and after thermal processing.



E ≠ 1-R / Temporary or permanent changes observed in the spectra ➔ New emissivity spectral library for „sensible" materials is needed!

Spectral changes due to heating show dependence on the grain size fraction (already observed in VIS for Messenger).