Experimental petrology and spectroscopy: building analogue samples in laboratory for planetary exploration

EGU General Assembly, May 26th

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PVRG Petro-Volcanology Research Group

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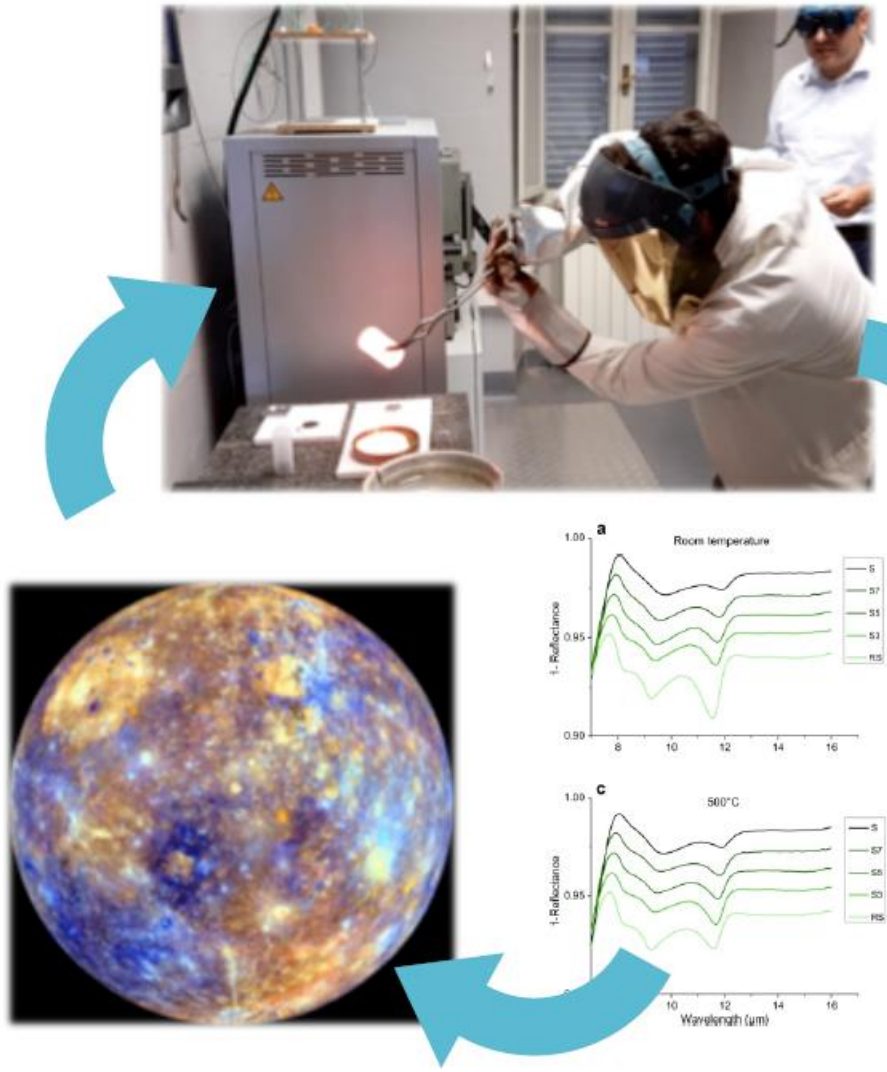
The idea: using experimental petrology to build up analogues

We can create samples in the lab recreating hypothesized extra-terrestrial compositions



We characterize samples by means of spectroscopy

We are able to interpret planetary spectral information with a database

Possible methodologies for sample production

FROM NATURAL SAMPLES
By melting, and possibly mixing, natural rocks to obtain intermediate compositions

Molten at 1500°C

Quenched in air

FROM OXIDES
By mixing oxides of the main rock-forming elements to obtain the desired composition

PVRG at UniPG

Previous works using such methodology with silicate glasses

Article | Open Access | Published: 23 October 2019

Retrieving magma composition from TIR spectra: implications for terrestrial planets investigations

Alessandro Pisello, Francesco P. Vetere, Matteo Bisolfati, Alessandro Maturilli, Daniele Morgavi, Cristina Pauselli, Gianluca Iezzi, Michele Lustrino & Diego Perugini

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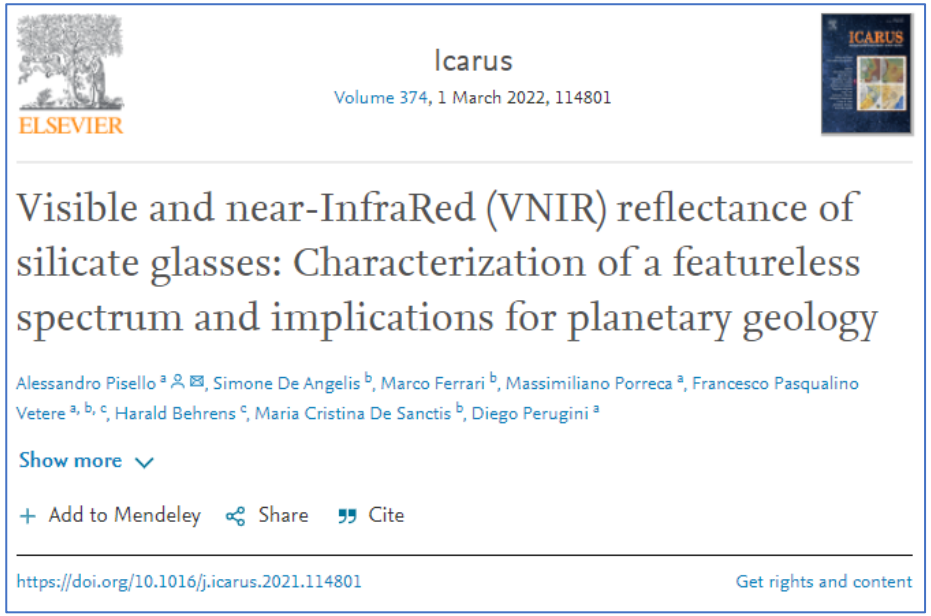

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Icarus

Volume 374, 1 March 2022, 114801

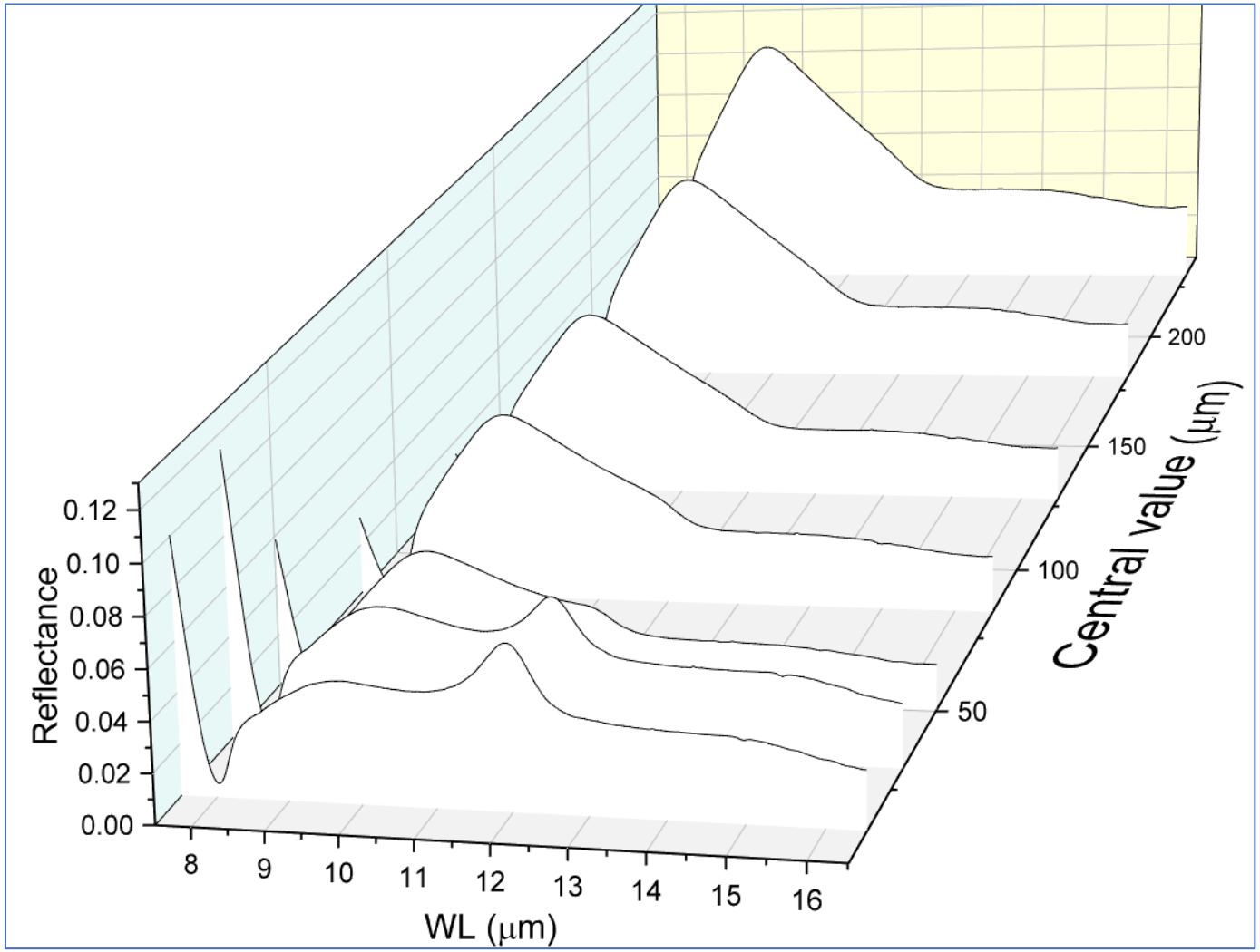
Visible and near-InfraRed (VNIR) reflectance of silicate glasses: Characterization of a featureless spectrum and implications for planetary geology

Alessandro Pisello [a], Simone De Angelis [b], Marco Ferrari [b], Massimiliano Porreca [a], Francesco Pasqualino Vetere [a, b, c], Harald Behrens [c], Maria Cristina De Sanctis [b], Diego Perugini [a]

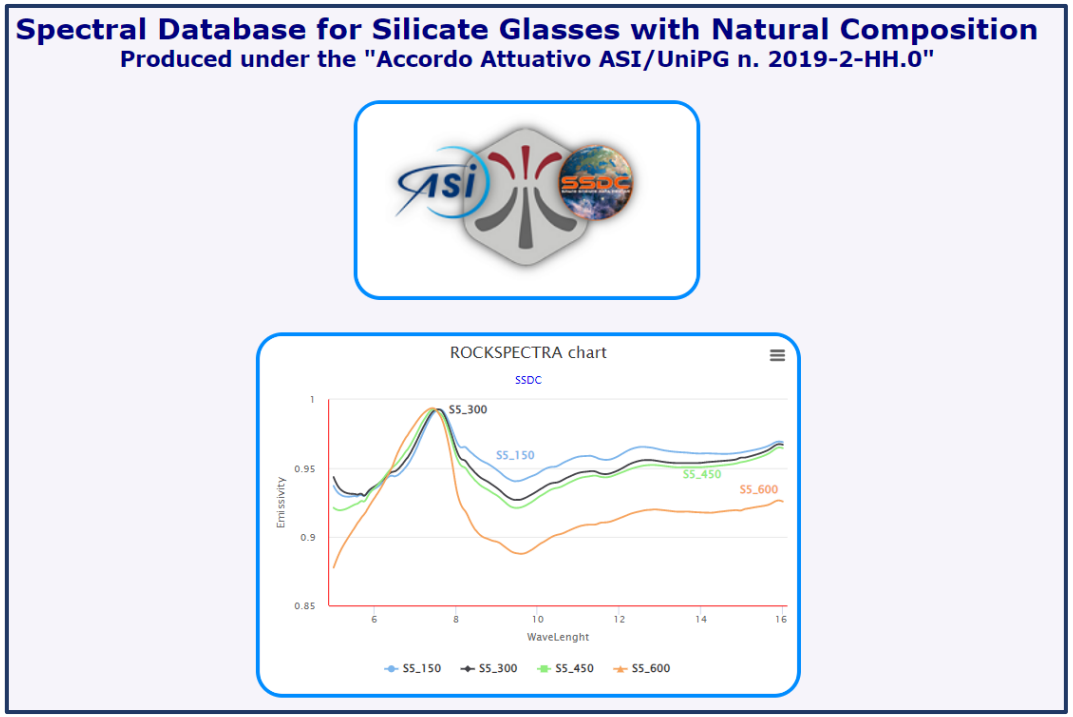
https://doi.org/10.1016/j.icarus.2021.114801

Ongoing project using such methodology with silicate glasses

We have reproduced Mercury-like composition to perform granulometrical analyses



We are creating an open-source database on SSDC, soon available (August-September 2022)



Consider us for analogue production!

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