

The need to obtain reflectance spectra of Solar System materials in the VUV range

- Below 200 nm, it is necessary to leave Earth's atmosphere, which limits the available options for studying Solar System bodies.
- Meteorites serve as proxies for minor Solar System bodies and can be studied easily and cost-effectively in the laboratory.
- The data obtained are vital for the design of FUV space missions.

Importance of meteorite's studies in the VUV range

- Degree of carbonation in C-type asteroids.
- Meteorite's hydration (band at ≈ 166 nm).
- Space weathering effects: Solar wind and radiation and micrometeorite impacts. Formation of npFe^0 (detected at 0.0001% npFe^0 content).

Current state of research

- Limited UV spectral data.
- Most studies are several decades old and used older technologies.

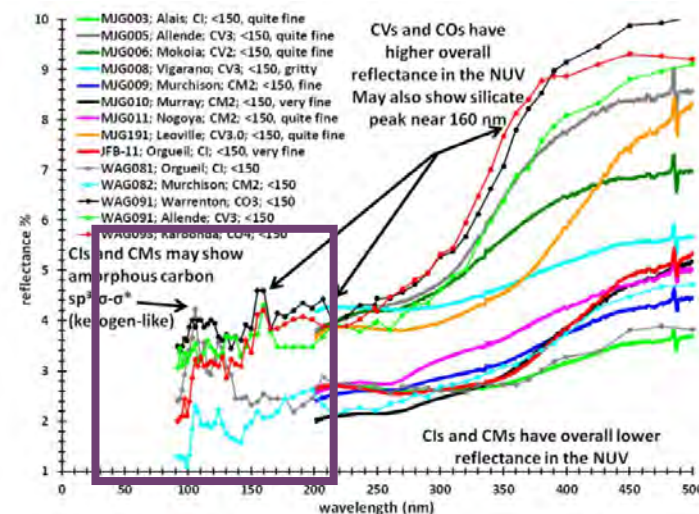


Figure 1. Ultraviolet reflectance spectra of the Goalpara ureilite and the Orgueil CM2 chondrite. Graphic obtained from Applin et al. (2018); data at the FUV range obtained from Wagner et al. (1987).

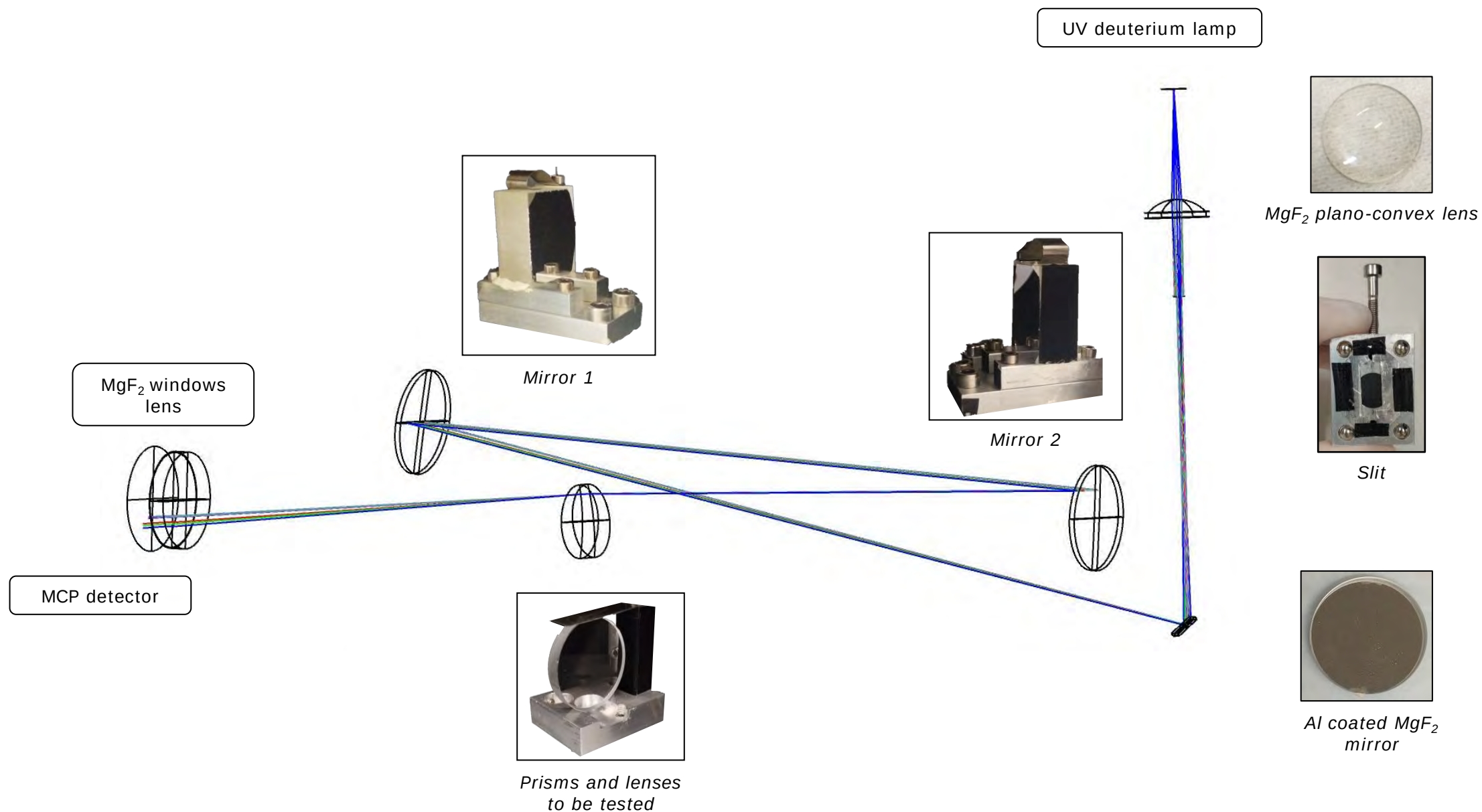
Objectives

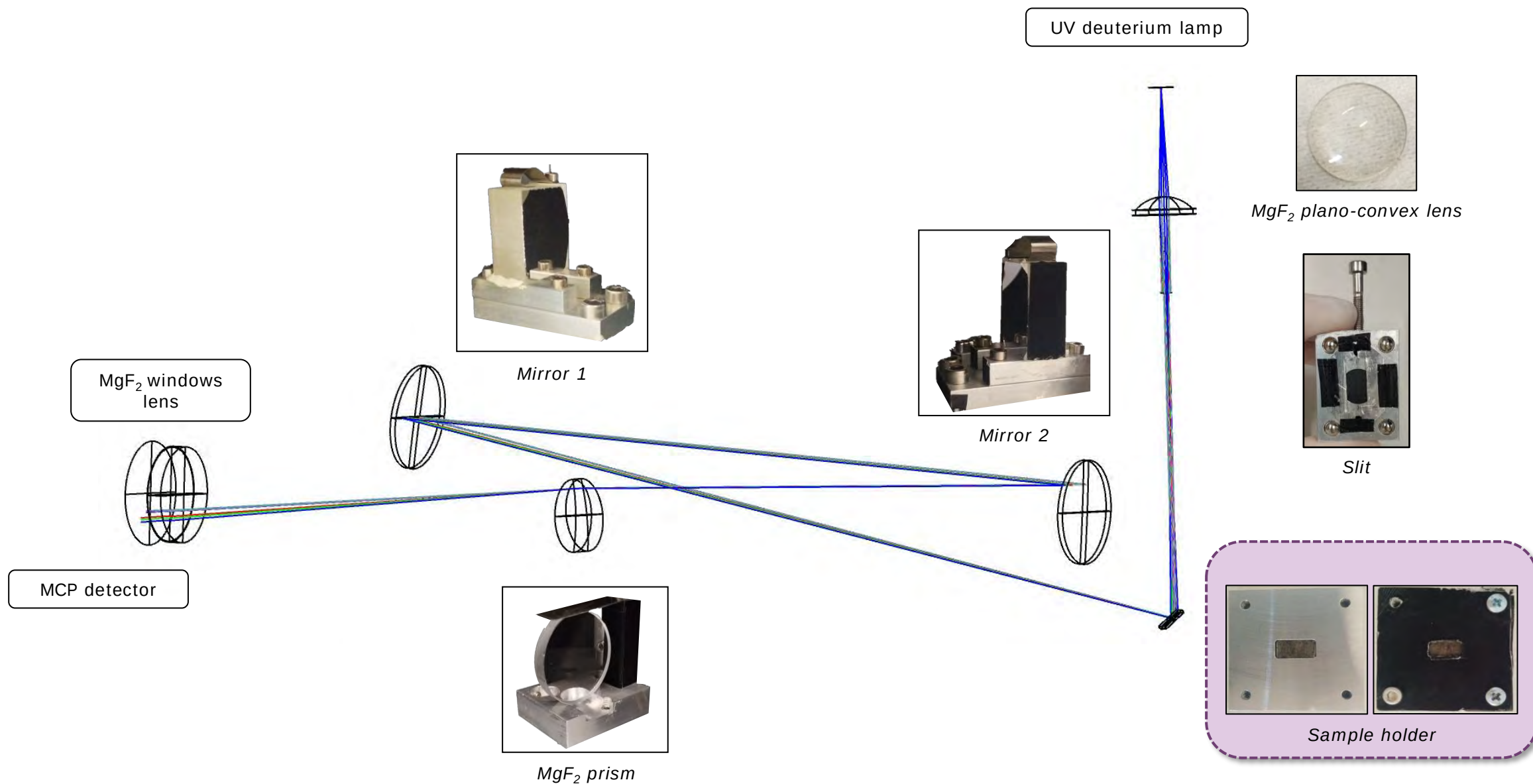
- Redesign an instrument into a reflectometer that operates between 120-190 nm.
- Measure the reflectance of different samples such as a collection of meteorite's samples.



Optical emulator

Designed to test the performance of different prisms and lenses



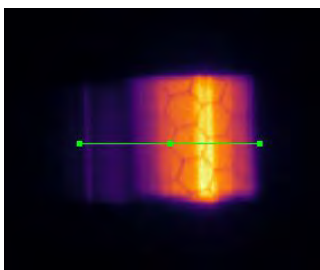


						
NAGJIR 001 CV3	NWA 13879 CV red 3	NWA 13880 CR2	NWA 13573 CVOX A3	NWA 14933 CV red 3	SUEILILA 006 CK-6	NWA 14110 CO3

- Realignment of the optical elements of the system.



Acquisition of the reference lamp spectrum.



- Determination of the optimal conditions for meteorite measurement.

- Exposure time.
- Voltage (Gain).

- Minimize the diffuse reflection from the samples.

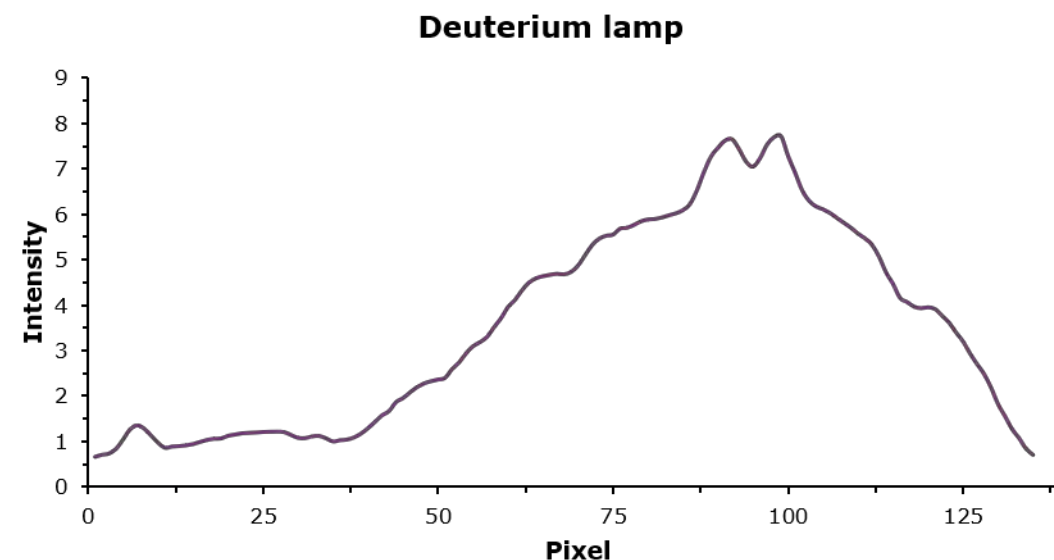


Figure 2. Reflectance spectrum of 30 W deuterium lamp obtained from the reflectometer.

References

- [1] Wagner, J. K.; Hapke, B. W.; Wells, E. N.; Icarus, 1987, 69, 14–28.
- [2] Applin, D. M.; Izawa, M. R. M.; Cloutis, E. A.; Gillis-Davis, J. J.; Pitman, K. M.; Roush, T. L.; Hendrix, A. R.; Lucey, P. G.; Icarus, 2018, 307, 40–82.
- [3] Gómez de Castro, A. I.; Sánchez-Blanco, E.; Proc. SPIE 12181, 2022.