

Simulant Name: LHS-1 Lunar Highlands Simulant
Simulant Type: General purpose
Reference Material: Average lunar highlands
Uncompressed Bulk Density: 1.30 g/cm³
Mean Particle Size: 60 μm
Median Particle Size: 50 μm
Particle Size Range: <0.04 μm – 400 μm



Mineralogy

As mixed.

Component	Wt.%
Anorthosite	74.4
Glass-rich basalt	24.7
Ilmenite	0.4
Olivine	0.3
Pyroxene	0.2

Safety

See SDS for details. Primary hazard is dust inhalation; wear a respirator in dusty conditions.

Bulk Chemistry

Relative abundances. Measured by XRF.

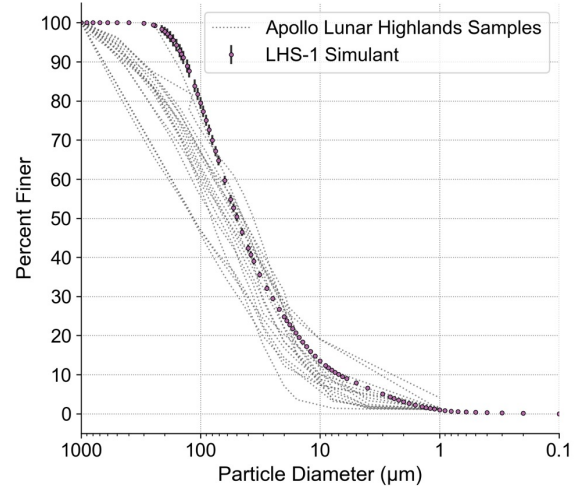
Oxide	Wt.%
SiO ₂	51.2
TiO ₂	0.6
Al ₂ O ₃	26.6
FeO	2.7
MnO	0.1
MgO	1.6
CaO	12.8
Na ₂ O	2.9
K ₂ O	0.5
P ₂ O ₅	0.1
LOI*	0.4
Total**	99.4

* Loss on ignition

** Excluding volatiles and trace elements

Particle Size Distribution

From CILAS 1190 laser diffraction particle size analyzer



Reflectance Spectrum

Incidence angle 30°, emission angle 0°

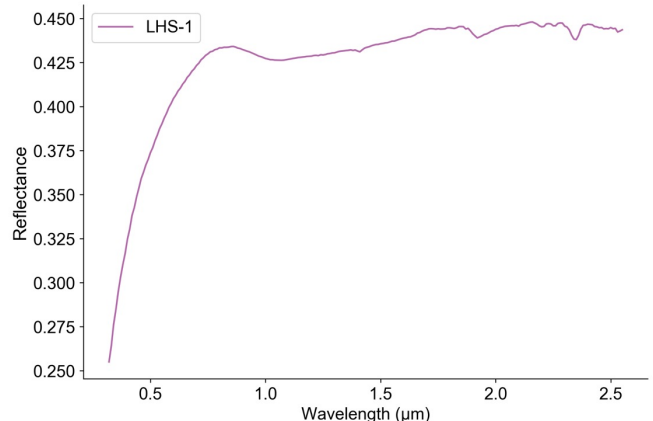
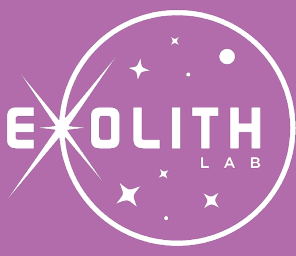


Photo credit Matthew Villegas. XRF data obtained by Hamilton Analytical Lab using fused bead sample preparation. Reflectance spectrum courtesy of Dr. Takahiro Hiroi, NASA RELAB, Brown University.



Trace Elements

Measured by XRF

Element	ppm
Ni	26
Cr	54
V	46
Sc	6.2
Cu	14
Zn	29
Ga	19
Ba	265
Rb	9
Cs	0
Sr	349
Y	4
Zr	59
Hf	1.9
Nb	10.6
Ta	1
Mo	4
La	12
Ce	20
Nd	7
Sm	0.7
Dy	1.9
Yb	0.0
Th	0
U	1
Tl	0
Pb	4
Sn	3
Bi	0
Sb	1

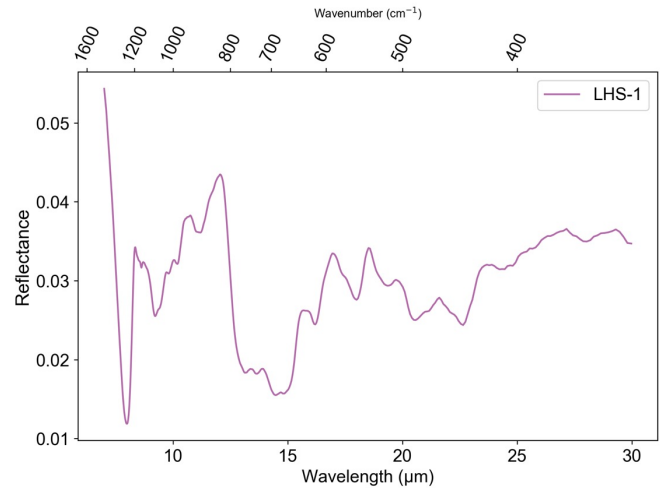
Volatiles

Measured by XRF

Compound	Wt%
F	≥0.07
Cl	≥0.006
SO ₃	≥0.01

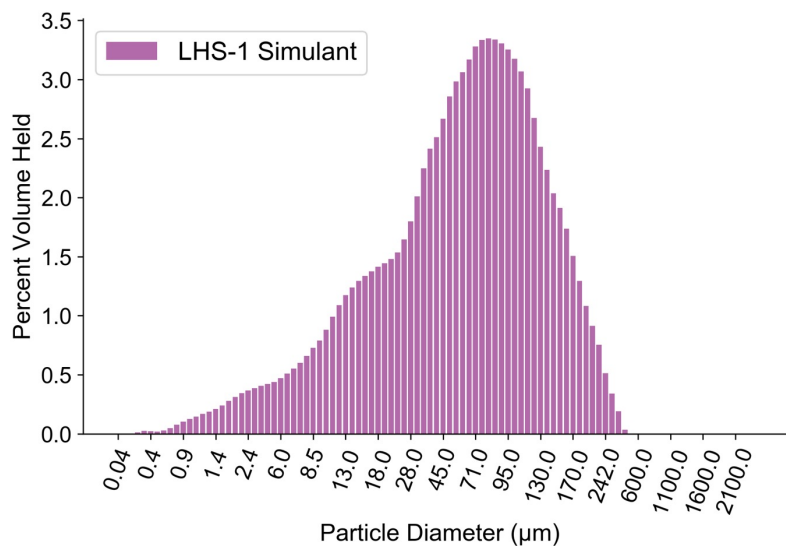
Compound	ppm
Br	≥3
As	≥1

Mid-Infrared FTIR Spectrum



Additional Particle Size Data

From CILAS 1190 laser diffraction particle size analyzer



Particle Diameter	Percentage finer
1 mm	100.0%
250 μm	99.4%
125 μm	87.7%
75 μm	67.2%
45 μm	46.5%
10 μm	13.5%

XRF data obtained by Hamilton Analytical Lab using fused bead sample preparation. FTIR spectrum courtesy of Dr. Takahiro Hiroi, NASA RELAB, Brown University.