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Supporting Online Material for

Pyroclastic Activity at Home Plate in Gusev Crater, Mars

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Figs. S1 to S7
Table S1

Supplemental Online Material

Figure S1: Microscopic Imager image of the lower unit of Home Plate, showing coarse granules. Scale across the image is 3 cm. Microscopic Imager image 2M192958525.

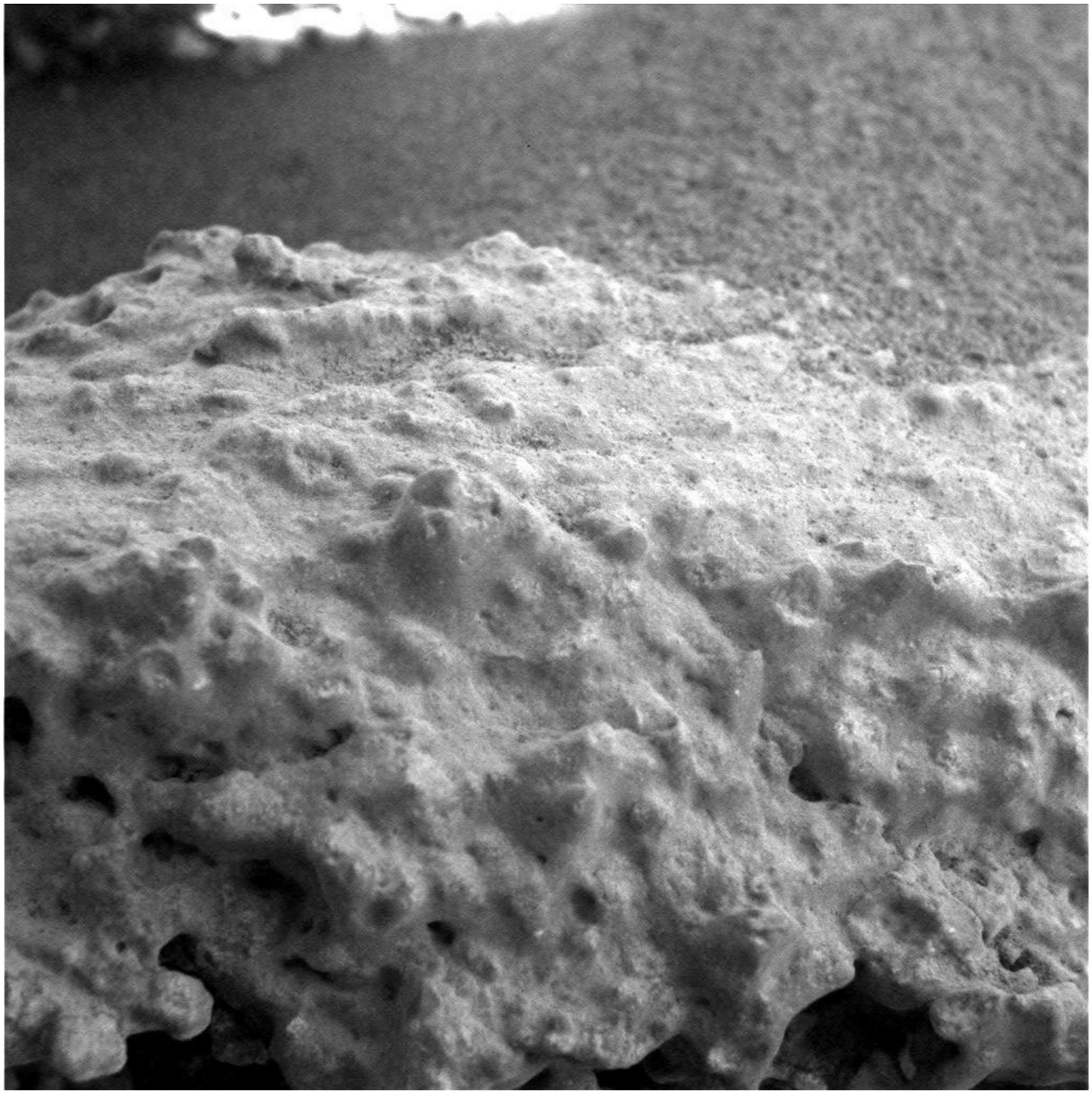

Figure S2: Microscopic Imager image of the lower unit of Home Plate, showing indistinct grain boundaries. Scale across the image is 3 cm. Microscopic Imager image 2M192682040.

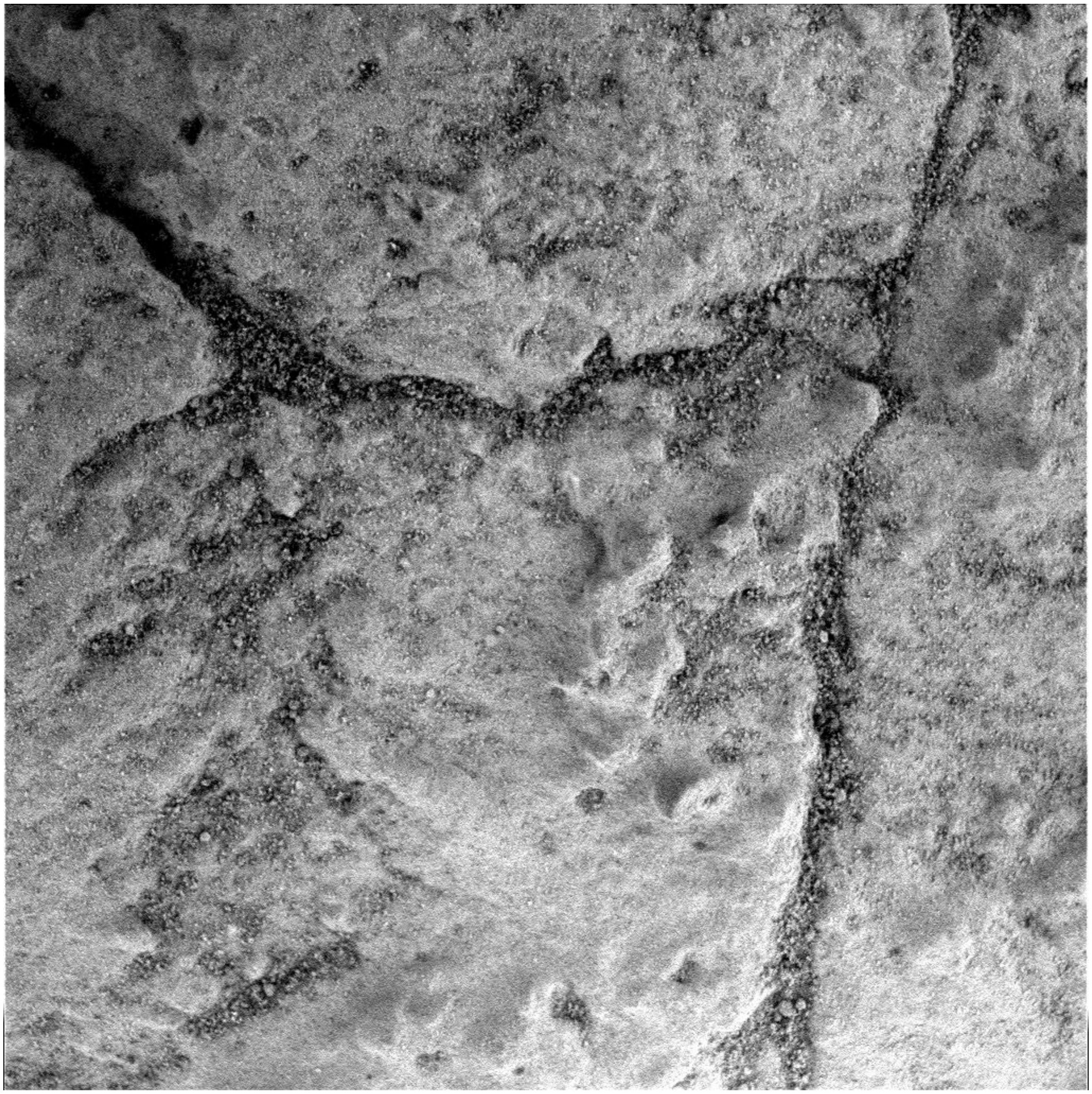

Figure S3: Microscopic Imager image of a portion of the upper unit of Home Plate that has been brushed using the Rock Abrasion Tool. Grains are very well rounded and sorted. Scale across the image is 3 cm. Microscopic Imager image 2M194100679.

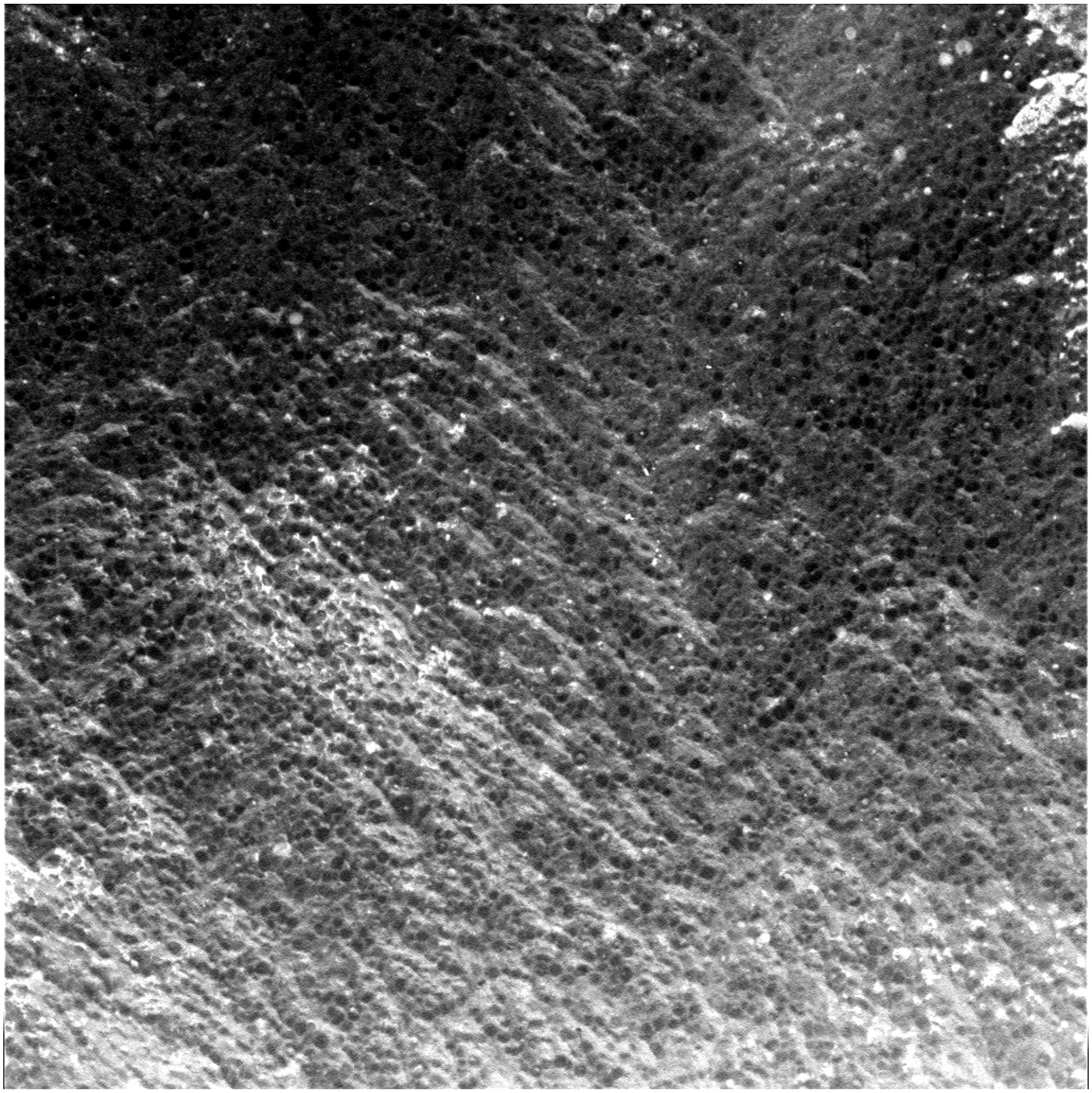

Figure S4: Bedding plane orientation at four locations imaged at Home Plate, shown on HiRISE image PSP_001513_1655. North is at the top. Spirit site and position numbers for each location are given; e.g., 124/55 denotes Site 124, Position 55. Histograms show measured strikes and dips at each location. A total of 93 measurements of strike and dip were made. Black arrows indicate the orientation of a plane describing the face of the outcrop. To determine strike and dip, parameters describing plane geometries were obtained from a principal component analysis applied to the coordinates of points along individual laminae identified in stereo images. Generally, layers were more than 75 pixels in extent (i.e. 10 cm at a maximum distance of 5 m), and a similar number of data points were extracted from the topographic grids. Layers were only used where the distance to the target was small enough that the natural topography of the outcrop was clearly larger than the noise level, typically <1cm. Measurements were rejected if coordinates were approximately collinear and hence failed to produce a unique planar solution, or in instances where the coordinates were not well fit by a plane.

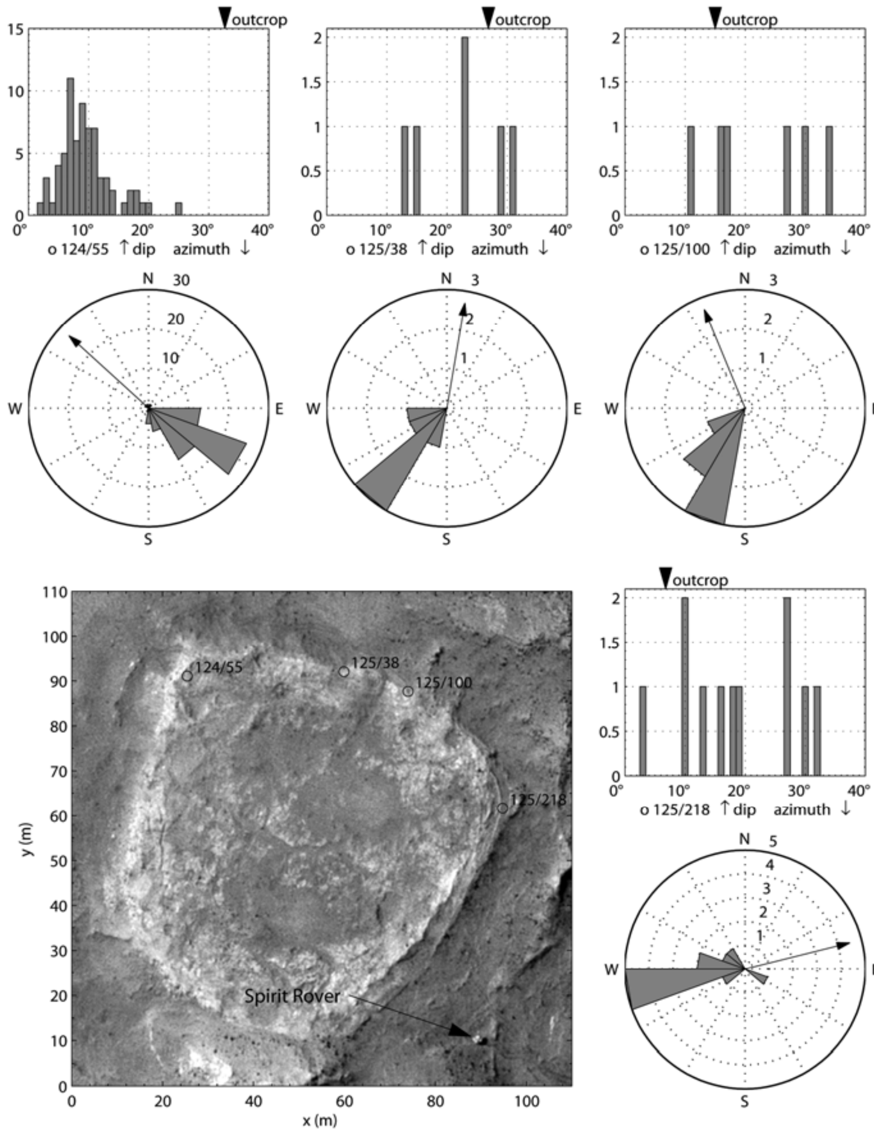

Figure S5: Pancam visible/near-IR spectra for the rocks Posey and Cool Papa Bell. R* is relative reflectance, defined as I/F divided by the cosine of the incidence angle

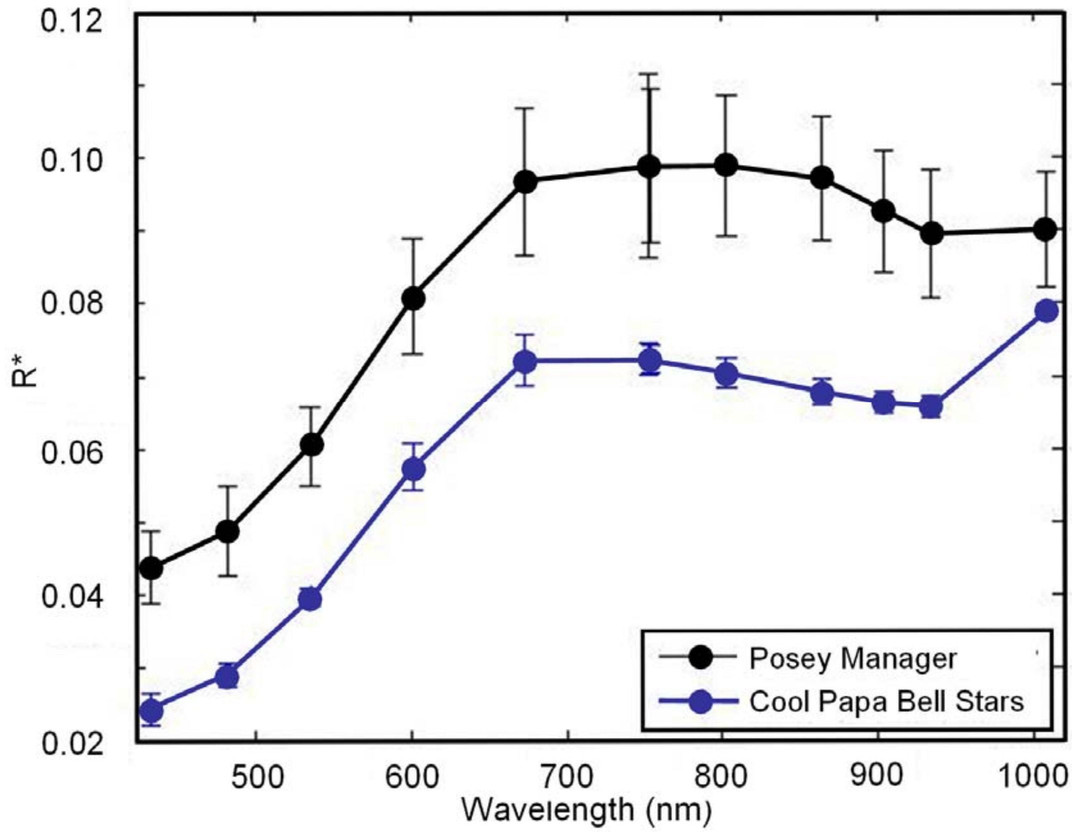

Figure S6: Mini-TES emissivity spectrum of average Home Plate rocks. Black curve shows the data, blue curve shows the spectrum of the mineralogical model fit to the data described in the text. The spectral region centered around 15 m is obscured by atmospheric CO_2.

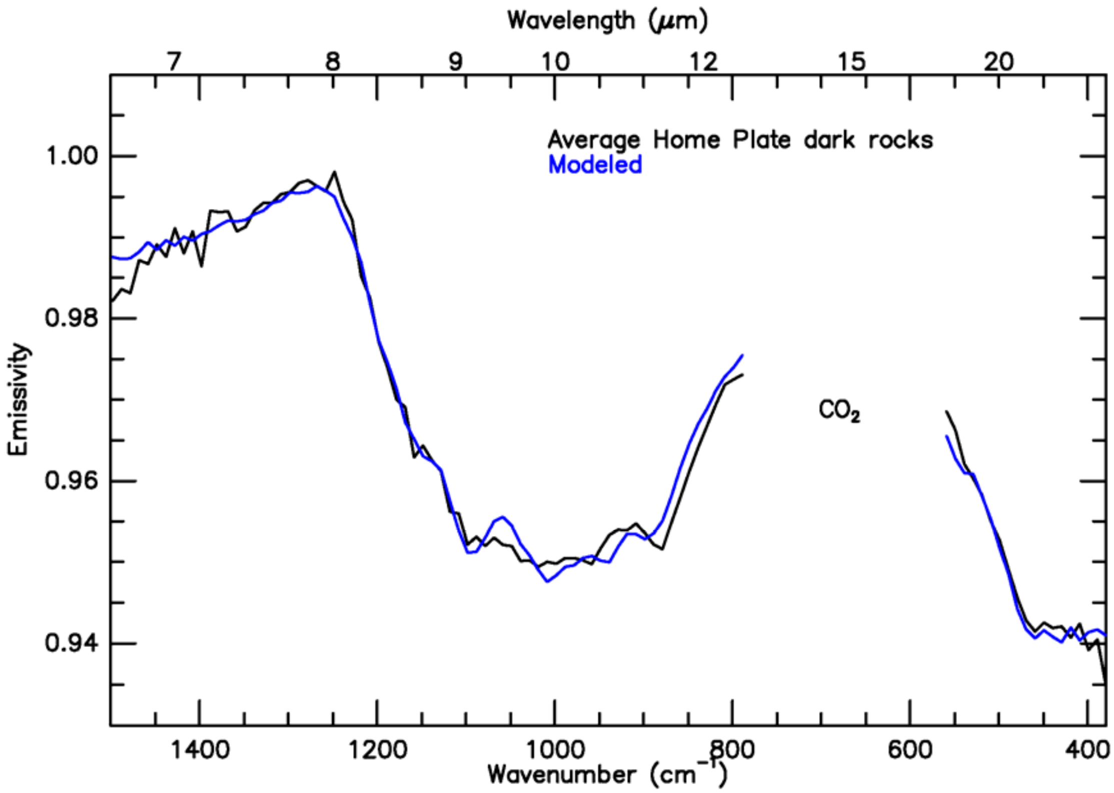

Figure S7: Approximate true color image of the rock Fuzzy Smith, assembled using data from all of Pancam's color filters. Approximate size of Fuzzy Smith is ~10 cm. Image sequence P2595 acquired on Sol 772.

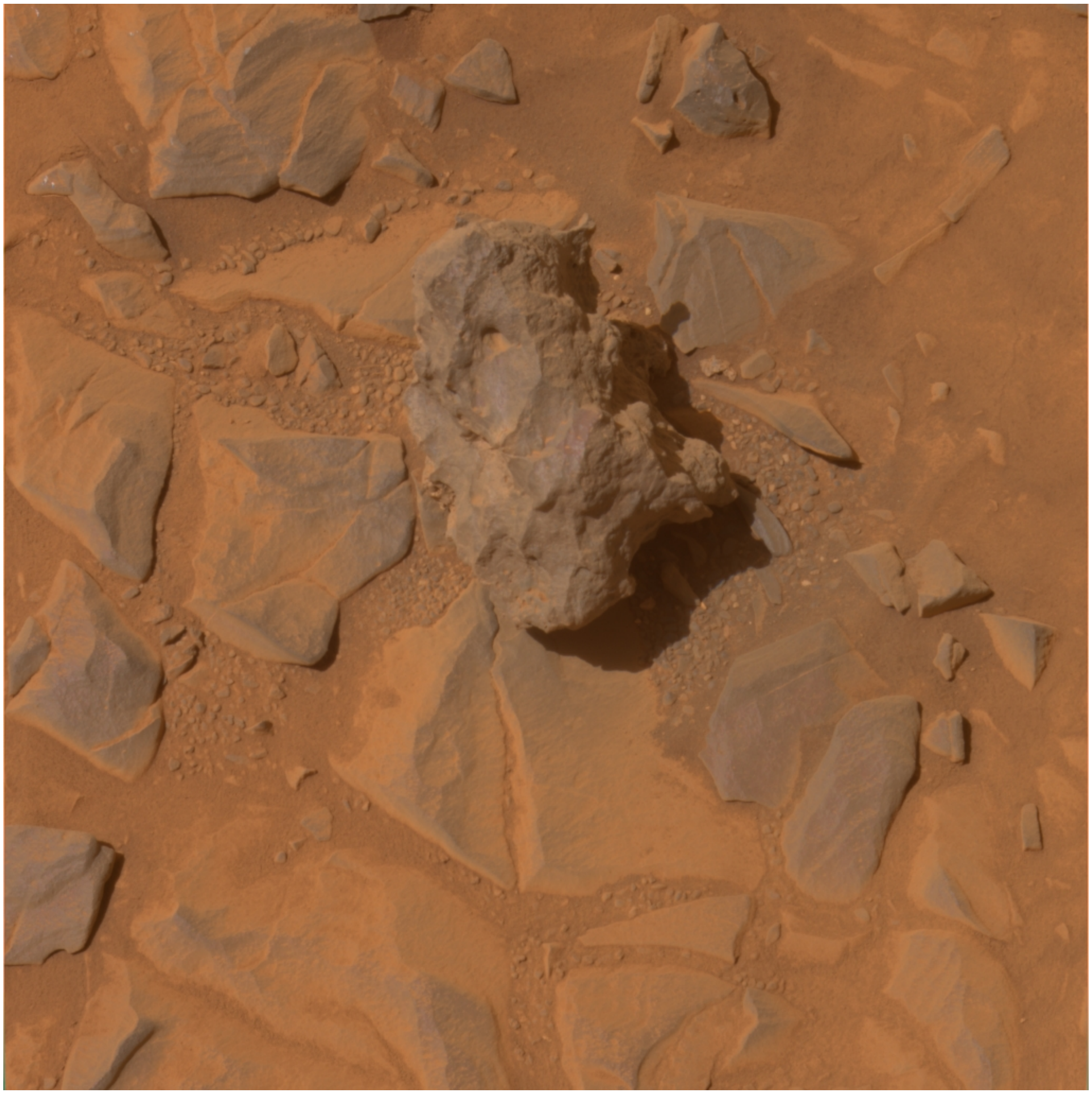

Table S1: Derived Mössbauer mineralogy and Fe^{3+}/Fe_{Total} (190-270 K) for Home Plate rocks.

Generic Name	Fe2D1	Fe2D2	Fe2D3	Fe3D1	Fe?D1		Fe3S1	Fe2.5S1	Fe3S2		
Phase Assignment[a]	Ol	Px	Ilm	npOx	Fe?D1[b]	Mt	Mt(3)	Mt(2.5)	Hm	Sum	Fe^{3+}/Fe_{Total}
	%	%	%	%	%	%	%	%	%	%	
Barnhill Ace	18[c]	23	0	29	0	26	11	14	5	100[f]	0.52[g]
Posey Manager	17	23	0	27	0	29[e]	13[d]	15	5[d]	100	0.52
Cool Papa Bell Stars	17	24	0	30	0	26	11	14	4	100	0.52
Fuzzy Smith	3	27	6	0	64[d]	0	0	0	0	100	0.64[h]

[a]Ol = olivine, Px = pyroxene, npOx = nanophase ferric oxide, Mt = magnetite, and Hm = hematite.
[b]For doublet Fe?D1, isomer shift $\delta = 0.28\pm0.02$ mm/s and quadrupole splitting $\Delta E_Q = 0.67\pm0.02$ mm/s.
[c]Uncertainty in subspectral area is ±2% absolute unless stated otherwise.
[d]Uncertainty in subspectral area is ±3% absolute.
[e]Uncertainty in subspectral area is ±4% absolute.
[f]Because Mt = Mt(3) + Mt(2.5), Sum = Ol + Px + npOx + Fe?D1 + Mt + Hm.
[g]Fe^{3+}/Fe_{Total} = (npOx + Fe3D6 + Mt(3) + 0.5(Mt(2.5)) + Hm)/Sum. Uncertainty in Fe^{3+}/Fe_{Total} is ±0.03.
[h]Assumes Fe?D1 is Fe^{3+}. If Fe?D1 is Fe^{2+} (sulfide), Fe^{3+}/Fe_{Total} = 0.00.