

Auxiliary material for

High manganese concentrations in rocks at Gale crater, Mars

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Introduction

This data set contains information about laboratory standards used to quantify manganese in laser-induced breakdown spectroscopy (LIBS) data in this study in “2014GL060329-ts01.xlsx.”

Detailed information about the 60 rock sampling locations containing the highest Mn (>1.3 wt% MnO) observed by ChemCam in the first 360 sols of the mission and reported on in this paper can be found in “2014GL060329-ts02.xlsx.” Examples of different Mn trends with depth (shot number) observed on some martian rock surfaces, including increasing, decreasing, and flat, are shown in “2014GL060329-fA04.pdf.”

1. 2014GL060329-ts01.xlsx **Table S1.** Manganese standards used in the univariate model of Mn abundance.

1.1 Column “Name,” name of the geochemical standard.

1.2 Column “Material type,” rock type or mineralogy of the standard.

1.3 Column “Source,” information about where the standard was obtained and made, if available.

1.4 Column “MnO (wt%),” weight percent MnO, manganese abundance in of the standard as given by provider.

2. 2014GL060329-ts02.xlsx **Table S2.** ChemCam rock target locations containing elevated Mn abundances.

2.1 Column “Target,” name of rock target.

2.2 Column “Sol,” sol (martian day of MSL mission) on which target data was acquired.

2.3 Column “Formation,” martian geologic unit in which target is located.

2.4 Column “SeqID,” spacecraft sequence uplinked to Mars Science Laboratory rover to obtain target data with the ChemCam instrument.

2.5 Column “Raster type,” configuration of sampling locations, e.g. a 1x5 raster contains five sampling locations in a row where as a 3x3 raster contains nine sampling locations arranged in a box. A sampling location typically has 30 laser shots (spectra) per location.

2.6 Column “Raster location,” sampling location within the raster. ChemCam typically samples from right to left and from bottom to top; for example, location 3 in a 3x3 raster represents the lower left-hand corner of a square raster.

2.7 Column “Shot-to-shot trend with depth,” indicates whether a trend in manganese exists from shot to shot, and if so whether it is increasing or decreasing with depth (shot number). An example of each possible trend can be found in “fs01.jpg.”

2.8 Column “Texture,” rock surface texture and color characteristics.

2.9 Column “Average Mn abundance (MnO wt%),” weight percent MnO, modeled manganese abundance in target location. Data represent the average of all shots in that location, with the Mn abundance of each shot modeled individually and then averaged.

3. [2014GL060329-fA04.pdf](#) **Figure S1.** Example Mn peak area trends with depth in individual shot data; note that the first few shots sample dust and have low Mn abundances distinct from the main trends. **(a)** Decreasing Mn with depth in Gunflint, location 3 (sol 329). **(b)** Flat trend with depth in Rocknest-3_2, location 4 (sol 83). **(c)** Increasing trend with depth in Peg, location 4 (sol 71).