MINERALOGY AND FORMATION PROCESSES FOR THE-VERA RUBIN RIDGE AT GALE CRATER, MARS, FROM CHEMIN XRD ANALYSES. R. V. Morris[1], T. F. Bristow[2], E. B. Rampe[1], A. S. Yen[3], D. T. Vaniman[4], V. Tu[5], A. H. Treiman[6], M. T. Thorpe[1], T. S. Peretyazhko[5], S. M. Morrison[7], D. W. Ming[1], R. M. Hazen[7], R. T. Downs[8], G. W. Downs[8], D. J. Des Marais[2], P. I. Craig[4], S. J. Chipera[7], N. Castle[6], D. F. Blake[2], and C. N. Achilles[9]. [1]NASA Johnson Space Center, Houston TX (richard.v.morris @nasa.gov), [2]NASA Ames Research Center, Moffett Field, CA, [3]JPL-Caltech, Pasadena, CA, [4]PSI, Tucson, AZ, [5]Jacobs-JETS, Houston, TX, [6]LPI, Houston, TX, [7]Carnegie Institution for Science, Washington, DC, [8]Univ. of Arizona, Tucson, AZ, [9]NASA Goddard Space Flight Center, Greenbelt, MD.

The CheMin instrument onboard the Mars Science Laboratory (MSL) rover Curiosity has investigate the hematite-bearing Vera Rubin Ridge (VRR) and adjacent downslope terrains on the lower flanks of Mt Sharp in Gale Crater, Mars, since sol 2062, and the rover is now poised (sol 2265) to travel upslope off the VRR. During this sol interval, the Chemistry and Mineralogy (CheMin) transmission XRD instrument analyzed four drill samples introduced into the instrument: (1) sample Duluth was acquired from the Blunts Point member of the Murray formation stratigraphically below the resistant units of the VRR; (2) sample Stoer was acquired from Pettigrove Point member of the VRR, and samples Highfield (3) and Rock Hall (4) were acquired from the grey Jura and red Jura member sub units, respectively, of the VRR. Preliminary analyses of the XRD patterns by Rietveld and FULLPAT numerical analysis to determine relative abundances (in wt.%) of crystalline minerals and XRD amorphous material are shown in Figure 1 for Duluth, Stoer, and Highfield. The igneous minerals feldspar and pyroxene constitute 30-38 wt.% of the total mass, secondary minerals, 26-31 wt.%, and amorphous phases 35-44 wt.%. The CheMin analysis of the red Jura sample Rock Hall is in complete as of abstract submission (1/3 of expected total integration time completed), but very preliminary analyses point to a very different crystalline mineral assemblage with akaganeite (β-FeO(OH,Cl)) abundance (~7 wt.%) superior to that of hematite. The presence of akaganeite can imply high concentrations of Cl in acidic environments, and its presence in high concentrations in Rock Hall will provide constraints for VRR formation processes.

Figure 1a. Duluth **1b. Stoer** **1c. Highfield**