



Mars Atmospheric Composition and Stable Isotope Ratios in H, C and O Measured by the SAM Instrument Suite on the Curiosity Rover

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From the Curiosity Rover sampling the near-surface Martian atmosphere in the vicinity of Gale Crater, volume mixing ratios of the five major constituents (CO₂, Ar, N₂, O₂ and CO) have been made using the Quadrupole Mass Spectrometer (QMS) of the Sample Analysis at Mars (SAM) suite that has additionally measured the isotope ratios of ⁴⁰Ar/³⁶Ar, and $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ in CO₂. A second SAM instrument, the Tunable Laser Spectrometer (TLS) has made a sensitive search for Martian methane, measured water abundances in the vicinity of the rover, and isotope ratios of $\delta^{13}\text{C}$, $\delta^{18}\text{O}$, $\delta^{17}\text{O}$ and $\delta^{13}\text{C}^{18}\text{O}$ in CO₂; and δD and $\delta^{18}\text{O}$ in H₂O. These atmospheric composition and isotope ratio measurements represent the most precise made in situ to date on any planetary surface and record Mars atmospheric escape and atmosphere-surface interactions. Updated values and error bars will be given for these measurements that provide a baseline for discussion and interpretation of SAM analysis of soil and rock samples [Mahaffy et al., EGU 2013]. Acknowledgement: The research described here was carried out at the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration (NASA).