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# Organic and Isotope Measurement Protocols Under Development for the 2009 Mars Science Laboratory

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The Mars Science Laboratory (MSL) is under development by NASA with several international partners for launch in 2009. MSL is designed to quantitatively explore a local region on Mars as a potential habitat for present or past life (http://mars. jpl. nasa. gov/msl). The goals of MSL are to (1) assess the past or present biological potential of the target environment, (2) to characterize its geology and geochemistry, (3) to study planetary processes that influence habitability, and (4) to characterize the surface radiation. The last substantial search for organic molecules on the surface of Mars was with the Viking Landers in 1976 [Biemann, et al., 1977]. In that mission, no organics were detected in near surface fines and presently a more comprehensive search is required to understand the potential of that planet to support life. While the Mars Exploration Rovers are able to identify mineralogical signatures of aqueous alteration, they are not equipped to search for organics. The planned capabilities of the MSL rover payload will enable a search for a wide range of organic molecules in both solid samples of rocks and fines and atmospheric samples. MSL will also provide a determination of definitive mineralogy of the solid samples and precision isotope measurements of several volatile elements. Contact and remote surface and subsurface survey tools will establish context for Analytical Laboratory measurements and will facilitate sample selection. The Sample Analysis at Mars (SAM) suite of MSL addresses several of the mission's core measurement goals. SAM includes a gas chromatograph, a mass spectrometer, and a tunable laser spectrometer. We will describe the range of measurement protocols under development and test for SAM and the relationship of our planned measurements to outstanding issues of martian habitability. References K. Biemann, J. Oro, P. Toulmin, L. Orgel, A. Nier, D. Anderson, P. Simmonds, D. Flory, A. Diaz, D. Rushneck, J. Biller, and A. LaFleur, 1977, The search for organic substances and inorganic volatile compounds in the surface of Mars, J. Geophys. Res.82, 4641-4658.