

## In situ measurement of atmospheric Kr and Xe isotopes on Mars

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Mars Science Laboratory's (MSL) Sample Analysis at Mars (SAM) investigation has analyzed an enriched sample of the heavy noble gases krypton and xenon in the martian atmosphere. The SAM instrument suite is part of the Mars Science Laboratory's science payload on the Curiosity rover.

Previously, we reported on the isotopes of the major martian atmospheric constituents, including argon [1].

A static mass spectrometry experiment, the first of its kind on another planet, measured the nine stable isotopes of xenon *in situ* with the SAM quadrupole mass spectrometer. Our measurements provide atmospheric end-member points of comparison for SNC (Shergotty-Nakhla-Chassigny) meteorite analyses, e.g. [2, 3, 4] as well as solar wind values [5]. The SAM data are in excellent agreement with the shergottite analyses, including EETA79001 Lith C [6], which is generally agreed upon to have the most authentic isotopic representation of trapped Martian atmosphere.

The SAM data have been analyzed with several approaches and background subtractions, yielding robust self-consistency within the measurement standard deviation.

[1] Mahaffy et al. (2013) *Science* **341**, 263-266. [2] Bogard & Johnson (1983) *Science* **221**, 651-654. [3] Bogard et al. (1984) *Geochim et Cosmochim A.* **48**, 1723-1739. [4] Becker & Pepin (1984) *EPSL*, **69**, 225-242. [5] Meshik et al. (2014) *Geochim. et Cosmochim. A.*, **127**, 326-347. [6] Swindle et al. (1986) *Geochim. et Cosmochim. A.*, **50**, 1001-1015.