APXS ANALYSES OF BOUNCE ROCK – THE FIRST SHERGOTTITE ON MARS.

J. Zipfel[1], R. Anderson[2], J. Brückner[1], B. C. Clark[3], G. Dreibus[1], T. Economou[4], R. Gellert[1,5], G. Klingelhöfer[5], G. W. Lugmair[1], D. Ming[6], R. Rieder[1], S. W. Squyres[7], C. d'Uston[8], H. Wänke[1], A. Yen[2], and the Athena Science Team.

[1]MPI für Chemie, Mainz, Germany. e-mail: zipfel@mpch-mainz.mpg.de. [2]JPL, Pasadena, CA, USA. [3]Lockheed Martin, Littleton, CO, USA. [4]LASR, Enrico Fermi Institute, Chicago, IL, USA. [5]J. Gutenberg-Universität Mainz, Germany. [6]JSC, Houston, Tx, USA. [7]Cornell University, Ithaca, NY, USA. [8]CESR, Toulouse, France.

Introduction: During the MER Mission, an isolated rock at Meridiani Planum was analyzed by the Athena instrument suite [1]. Remote sensing instruments noticed its distinct appearance. Two areas on the untreated rock surface and one area that was abraded with the Rock Abrasion Tool were analyzed by Microscopic Imager, Mößbauer Mimos II [2], and Alpha Particle X-ray Spectrometer (APXS). Results of all analyses revealed a close relationship of this rock with known basaltic shergottites.

APXS results: The APXS analysis on the abraded area (Glanz2) of Bounce Rock is shown in the Table. In addition, an analysis of a typical basalt (Humphrey) as found in Gusev crater is shown. While Gusev basalts have a very primitve nature with low SiO_2 and high MgO contents, Bounce Rock has the composition of more evolved basalts. It also has a chemical signature typical of basaltic shergottites: a high P_2O_5 content, a S content of 0.2 wt.%, a Fe/Mn ratio of 36.2 in close agreement with other shergottites (Fe/Mn = 36-44), a low mg-value of 0.42, and a high Ca/Al ratio of 1.7. Element concentrations fall well within the range of typical basaltic shergottites, with the exception of lower FeO and higher CaO and Br. Al_2O_3 concentrations and mg-values - both known to span a wide range in shergottites - are identical in Bounce Rock and lithology B of EETA79001 (EET-B). The resulting mineralogy is strongly pyroxene-normative: (in wt.%) magnetite 0.25, ilmenite 1.4, chromite 0.2, apatite 2.0, albite 12.7, anorthite 22.0, diopside 31.1, hypersthene 30.5.

	Hum-phrey RAT2	Bounce Rock Glanz2	EETA 79001 Lith. B	Sher-gotty	Zagami	QUE 94201
ref.	[3]		[4]	[4]	[4]	[5]
SiO_2	45.7	**50.8**	49.0	51.4	50.8	48.0
TiO_2	0.53	**0.78**	1.1	0.87	0.77	1.8
P_2O_5	0.59	**0.95**	1.3	0.80		
Al_2O_3	10.6	**10.1**	9.93	7.06	5.67	12.0
Cr_2O_3	0.59	**0.12**	0.18	0.20	0.30	0.13
MnO	0.38	**0.43**	0.45	0.53	0.50	0.44
FeO	18.0	**15.6**	17.7	19.4	18.0	18.3
MgO	11.5	**6.5**	7.4	9.3	11.0	6.2
CaO	7.53	**12.5**	11.0	10.0	10.8	11.3
Na_2O	2.8	**1.25**	1.66	1.29	0.99	1.75
K_2O	0.08	**0.10**	0.065	0.16	0.14	0.05
Ni ppm	190	**<120**	46	83	67	<20
Zn ppm	120	**50**	120	83	62	130
Br ppm	50	**30**	0.287	0.890	0.870	0.350
Sum	99.50	**99.55**	99.86	100.96	98.97	99.97

Conclusion: Bounce Rock chemically closely resembles basaltic shergottites, in particular to EET-B. This, and results from the other instruments, provide further evidence that "Martian" meteorites do indeed come from Mars.

Reference: [1] Squyres S. W. et al. (2003), *J. Geophys. Res.*, **108 (E12)**, 8062, doi:10.1029/2003JE002121. [2] Rodionov D. et al. (2004),

this issue. [3] Gellert et al. (2004) *Science*, subm. [4] Banin et al. (1992) In *Mars*, 594-625. [5] Dreibus et al. (1996) *MAPS* **31** (Suppl.), A39-A40.