MÖSSBAUER INVESTIGATION OF 'BOUNCE ROCK' AT MERIDIANI PLANUM ON MARS – INDICATIONS FOR THE FIRST SHERGOTTITE ON MARS.

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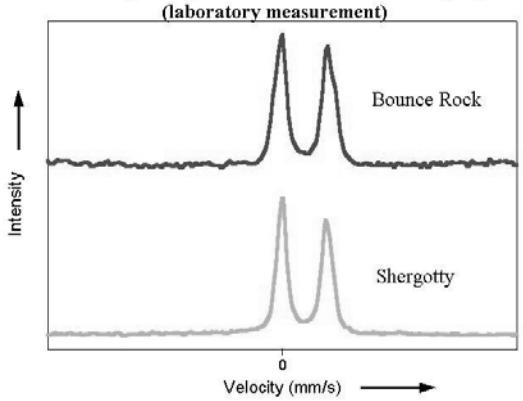
Introduction: During the Mars-Exploration-Rover (MER) 2003 Mission, an isolated rock lying on top of the plains at Meridiani Planum was analyzed by the Athena instrument suite. Remote sensing instruments [1] noticed its distinct appearance. Several areas on the untreated rock surface and one that was ground with the Rock Abrasion Tool (RAT) [1] were analyzed by the Mössbauer (MB) spectrometer Mimos II [2], the Microscopic Imager [1], and Alpha Particle X-ray Spectrometer (APXS) [3]. Results of all analyses revealed a close compositional relationship of this rock with known basaltic shergottites.

MIMOS II Mössbauer results: All seven MB spectra obtained on different places on Bounce Rock are nearly identical, indicating a rather homogeneous mineralogical composition. In the figure below the spectrum obtained at the Bounce Rock target named Fips-2 is shown, as well as one of our laboratory spectrum from Shergotty. Just by visual comparison it can be seen that they are very similar. The MB spectrum for EETA79001, lithology B, also is very similar in MB parameters to the Bounce Rock spectra. The mineralogy identified by Mössbauer spectroscopy is strongly pyroxene. This result is supported by the APXS data [4].

Mössbauer spectra of Bounce Rock (Meridiani Planum, sol 67) and the SNC meteorite Shergotty (laboratory measurement)



Conclusion: The Mössbauer mineralogy of Bounce Rock is very similar to basaltic shergottites, in particular to Shergotty, but also to EETA79001, lithology B. This finding as well as the results from APXS [4] support the evidence that Martian meteorites came from Mars.

Funded by the German Space Agency DLR and NASA, USA.

Reference: [1] Squyres S. W. et al. (2003), *J. Geophys. Res*., 108(E12), 8062, doi:10.1029/2003JE002121. [2] Klingelhöfer et al. *J. Geophys. Res*., 108(E12), 8067, doi: 10.1029 /2003 JE 002138, 2003. [3] Rieder et al. *J. Geophys. Res*., 108(E12), 8066, doi:10.1029/2003JE002150. [4,] Zipfel J. et al. (2004) this issue.