



An iron-nickel meteorite on Meridiani Planum: observations by MER Opportunity's Moessbauer spectrometer.

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The miniaturized Mössbauer spectrometer MIMOS II [1] is part of the Athena science payload onboard NASA's twin Mars Exploration Rovers "Spirit" and "Opportunity". The instrument determines the Fe-bearing mineralogy of Martian soils and rocks at the Rover's two landing sites in Gusev crater and on Meridiani Planum.

The Mössbauer spectra from Meridiani Planum are very diverse [2], and this diversity has been expanded by the discovery and analysis of a rock (~30 cm across) dubbed "Heat Shield Rock" because it was discovered lying next to the spacecraft's heat shield on the martian surface. "Heat Shield Rock" is abundant in iron and nickel and has been identified as an Fe-Ni meteorite by the Rover's instrument suite. The Mössbauer spectrum from a spot on that rock shows that the primary Fe-bearing phase is the Fe/Ni metal alloy kamacite. The hyperfine parameters from the spectrum extrapolated to ambient temperatures suggest more than 5 wt. % Ni within the kamacite phase [3], which is consistent with APXS elemental analysis yielding a Ni abundance of 7 wt. % [4].

[1] Klingelhoefer G. et al. (2003) *JGR* 108(E12), 8067;

[2] Klingelhoefer G. et al. (2004) *Science* 306, 1740-1745.

[3] Danon J et al. (1979), *Nature* 281, 469-471

[4] Yen A.S. et. al., this volume