MITT.ÖSTERR.MINER.GES. 149 (2004)

IMPORTANCE OF WEATHERED METEORITES FOR MARS: DATA ON VNIR REFLECTANCE-SPECTROSCOPY, RAMAN-SPECTROSCOPY AND MÖSSBAUER-SPECTROSCOPY

Kolb, C.[1,2], Abart, R.[2,3], Lottermoser, W.[4], Kaindl, R.[2] & Lammer, H.[1]

[1] Space Research Institute, Austrian Academy of Sciences, Schmiedlstrasse 6, A-8042 Graz, Austria
[2] Institute for Mineralogy and Petrology, University of Graz, Universitätsplatz 2, A-8010 Graz, Austria
[3] Mineralogical-Petrographic Institute, University of Basel, Bernoullistrasse 30, CH-4056 Basel, Switzerland
[4] Institute for Mineralogy, Hellbrunnerstrasse 34/III, University of Salzburg, A-5020 Salzburg, Austria
e-mail: christoph.kolb@oeaw.ac.at

With respect to global tectonics the present day Mars is considered as a single plated planet. Due to the lack of consumptive plate tectonics, the Martian sedimentary record represents a long-term archive of exogenic processes. The compositions and mixing relationships of three principal components, which may be inherent in Martian soil, were derived from APXS-Pathfinder and XRFS-Viking chemical data (KOLB et al., 2003). The principal soil components were chosen to represent Pathfinder Soil Free Rock, physical weathering products of Pathfinder andesites and meteoritic material with CI-chondrite composition. Correlation trends of the available chemical data in the ternary composition space of the principal components corroborate the existence of a Global Dust Unit and provide constraints on its composition. Evidence from spectroscopic data, returned by numerous Mars missions, has to be found to strengthen the argument of substantial meteoritic contribution to the Martian soil. VNIR reflectance spectroscopy has been used from the beginning of spectroscopic Mars research, because of the strong ferric absorption edge of Martian soil materials and easy achievement of space-flight proven hardware and telescopic observation. Mössbauer-spectroscopy is used for in-situ soil science in the frame of the Mars Exploration Rover mission (SQUYRES et al., 2003). Future mars missions will involve Raman-spectroscopy due to its capability in phase identification among intimate phase mixtures (ELLERY et al., 2003). We investigated meteoritic finds by means of VNIR reflectance-spectroscopy, Raman-spectroscopy and Mössbauer-spectroscopy. Current focus is given on meteoritic finds from Omani desert. Future investigations will consider chondritic finds from Antarctica, too.

References

ELLERY, A., KOLB, C., LAMMER, H., PARNELL, J., EDWARDS, H.G.M., RICHTER, L., PATEL, M.R., ROMSTEDT, J., DICKENSHEETS, D., STEELE, A. & COCKELL, C.S. (2003): Int. J. Astrobiol., **1**: 365-380.

KOLB, C., ABART, R., WAPPIS, E., PENZ, T., JESSBERGER, E.K. & LAMMER, H. (2003): In: JULL, A.J.T. (ed.) Meteoritics & Planetary Science 38, 7, Supplement, Meteoritical Society, Tucson, A15.

SQUYRES, S.W., ARVIDSON, R.E, BAUMGARTNER, E.T., BELL, J.F., III, CHRISTENSEN, P.R., GOREVAN, S., HERKENHOFF, K.E., KLINGELHÖFER, G., MADSEN, M.B., MORRIS, R.V., RIEDER, R. & ROMERO, R.A. (2003): J. Geophys. Res., **108**: 8062.