WEATHERING EFFECTS ON ORDINARY CHONDRITES FROM THE LUT DESERT (IRAN) STUDIED BY ^{57}Fe MÖSSBAUER SPECTROSCOPY.

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Recently, the Lut Desert has attracted the attention as a high potential area for finding meteorites [1]. This desert in the south – east of Iran between 28° 21' - 32° N and 57° 30' - 59° 55' E, extends in an area of about 8000 km^2 characterized by high temperature, precipitation rates less than 50 mm/year and high amounts of evaporation [1]. Data from Aqua/MODIS Climate Model Grid (CMG) shows that Lut desert has been the hottest area of the earth in the years 2004 - 2007 and 2009 with temperatures of 68.0, 70.7, 68.5, 69.0 and 68.6 °C, respectively [2]. Such climate conditions make the Lut Desert a high-potential region for preserving large concentrations of meteorites.

Following previous works, we will apply the ^{57}Fe Mössbauer spectroscopy and X-ray diffraction (XRD) to investigate weathering effects in ordinary chondrites (OC) [3]. Here, we present preliminary Mössbauer and XRD data on weathering in OC from the Lut Desert. Seven samples are being analysed: Kerman 001, Kerman 002, Lut 001, Lut 003, Lut 006, Lut 008 and Shahdad. The room temperature Mössbauer spectra of all samples exhibit two Fe^{2+} doublets, associated to olivine and pyroxene and a third Fe^{3+} doublet, corresponding to paramagnetic/superparamagnetic oxides and/or oxyhydroxides. For some samples (e.g. Lut 008), five sextets due to magnetically ordered phases were identified: troilite, kamacite/taenite, maghemite, hematite and goethite. Refinement of the XRD data was done using the Bruker TOPAS 4.2 © program with the fundamental parameters approach. Up to 18 different phases were considered during the Rietveld modeling. The phases were considered stoichiometric or with constant composition. Although there is a general agreement between XRD phase identification and Mössbauer data, more analysis are needed in order to quantify all weathering products. In addition, low temperature Mössbauer data is under way for identification of the superparamagnetic components. It is worth mentioning that Mössbauer and XRD results will be complemented with magnetic susceptibility data, optical microscopy and chemical analysis (gas chromatography, ICP-AES and ICP-MS), as described in [4], to give a complete picture of weathering in OC from the Lut desert.

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