**COSMIC RAY EXPOSURE HISTORY OF THE NEW OMANI LUNAR METEORITE SAYH AL UHAYMIR.** S. Lorenzetti[1], O. Eugster[1], E. Gnos[2], B. A. Hofmann[3], A. Al-Kathiri[2], I. Villa[2] and A. J. T. Jull[4], [1]Physikalisches Institut, UniBern, Switzerland, [2]Institut für Geologie, UniBern, Switzerland, [3]Naturhistorisches Museum, Bern, Switzerland, [4]NSF Acceleration Facility, University of Arizona, USA.

**Introduction:** Sayh al Uhaymir lunar meteorite consists of extremely Kreep-rich polymict, anorthosite-free impact-melt breccia and an adherent polymict regolith material. We studied the cosmic ray exposure (CRE) history of the impact-melt breccia by analysing the light noble gases He, Ne, and Ar and the transfer time from the radionuclide $^{10}$Be.

**Results:** TABLE 1 : Light noble gases in Sayh al Uhaymir lunar meteorite [$10^{-8}$cm$^3$STP/g]

| $^4$He | $^{20}$Ne | $^{40}$Ar | $^{20}$Ne/$^{22}$Ne | $^{22}$Ne/$^{21}$Ne |
|---|---|---|---|---|
| 42000 | 23.4 | 7449 | 0.802 | 1.197 |

**Transfer time Moon-Earth $T_{trans}$:** The $^{10}$Be activity in Sayh al Uhaymir lunar meteorite is 8.05 dpm/kg. In a scenario with no pre-exposure to cosmic rays on the Moon immediately before ejection and assuming a saturation activity of 25 dpm/kg at 4π irradiation geometry, we optain $T_{trans}$ =0.85 Ma. In an alternative scenario with pre-exposure in the upper layer of the lunar regolith, some $^{10}$Be activity was present at ejection, hence $T_{trans}$ is <0.85 Ma.

**Regolith residence time:** We calculated the cosmogenic components of $^{21}$Ne and $^{38}$Ar using the method given by [1]. Adopting production rates according to [1] and $T_{trans}$=0.85 Ma, we calculated the cosmogenic noble gases produced during the transfer. We find that 99% of the cosmogenic noble gases were produced at the lunar surface. With production rates for the lunar surface [2], assuming a shielding depth of 40g/cm$^3$, we get $T_{reg}$=200±40Ma.

**Discussion:** The Moon-Earth transfer time of Sayh al Uhaymir lunar meteorite lies in the range of 0.02-8 Ma [3] for other lunar meteorites. The exposure of Sayh al Uhaymir lunar meteorite to cosmic rays during $T_{trans}$ is short compared to $T_{reg}$. Since solar gases are absent in the impact-melt breccia, this material was never exposed at the very top surface in the regolith. $T_{reg}$ of Sayh al Uhaymir lunar meteorite is comparable with $T_{reg}$ of other lunar meteorites [5].

**References:** [1] Eugster O. and Michel Th. (1995) *Geochim. Cosmochim. Acta, 59,* 177-199. [2] Hohenberg C. et al. (1978) *Proc. Lunar Sci. Conf. 9$^{Th}$,* 2311-2344. [3] Nishiizumi K. et al. (1996) *Meteorit. Planet. Sci., 31,* 893-896. [4] Polnau E. and Eugster O. (1998) *Meteorit. Planet. Sci, 33,* 313-319.