

APPENDIX

SAMPLE DESCRIPTION

METHODOLOGY

We have selected four fresh melt rock samples from Lonar crater. The samples were crushed and 300-800 μm -size grains were selected for $^{40}\text{Ar}/^{39}\text{Ar}$ dating. Melt rock grains were carefully hand-picked under a binocular microscope. The selected grains were leached with diluted HF (2N) for 1 min. and thoroughly cleaned with distilled water in an ultrasonic cleaner.

Samples were loaded into several 1.9 cm diameter and 0.3 cm depth single-pit aluminum discs. The samples were bracketed by small wells that included Alder Creek sanidine used as a neutron fluence monitor for which an age of 1.193 Ma was adopted and a good in-between-grains reproducibility has been demonstrated ([Nomade et al., 2005](#)). The discs were Cd-shielded (to minimize undesirable nuclear interference reactions) and irradiated mid-2008 for 20 minutes in the Hamilton McMaster University nuclear reactor (Canada) in position 5C. A second batch of the same samples went through an identical sample preparation and was sent to McMaster reactor for a 2 hours irradiation during mid-2009.

Mass discrimination was monitored using an automatic air pipette. The mean J- and mass discrimination values for each experiment are given in Table DR1 (batch 1) and DR2 (batch 2). The correction factors for interfering isotopes were $(^{39}\text{Ar}/^{37}\text{Ar})_{\text{Ca}} = 7.30 \times 10^{-4}$ ($\pm 11\%$), $(^{36}\text{Ar}/^{37}\text{Ar})_{\text{Ca}} = 2.82 \times 10^{-4}$ ($\pm 1\%$) and $(^{40}\text{Ar}/^{39}\text{Ar})_{\text{K}} = 6.76 \times 10^{-4}$ ($\pm 32\%$).

The $^{40}\text{Ar}/^{39}\text{Ar}$ analyses were carried out at the Western Australian Argon Isotope Facility at Curtin University, operated by a consortium consisting of Curtin University and the University of Western Australia. The samples were loaded in 0-blank Cu-foil packages and were step-heated using a Pond Engineering® double vacuum resistance Furnace. The gas was purified in a stainless steel extraction line using a GP50 and two AP10 SAES getters and a liquid nitrogen condensation trap. Ar isotopes were measured in static mode using a MAP 215-50 mass spectrometer (resolution of ~ 500 ; sensitivity of 4×10^{-14} mol/V) with a Balzers SEV 217 electron multiplier using 9 to 10 cycles of peak-hopping. The data acquisition was performed with the Argus program written by M.O. McWilliams and ran under a LabView environment. The raw data were processed using the ArArCALC software ([Koppers, 2002](#)) and the ages have been calculated using the decay constants recommended by [Steiger and Jäger \(1977\)](#). Blanks were monitored every 3 samples. Isotopic data, constant and blank values are given in Tables DR1 and DR2. Individual errors in Table DR1 and DR2 are given at the 2σ level. Our criteria for the determination of plateau are as follows: plateaus must include at least 60% of ^{39}Ar . The plateau should be distributed over a minimum of 3 consecutive steps agreeing at 95% confidence level and satisfying a probability of fit (P) of at least 0.05. Inverse isochrons include the maximum number of steps with a probability of fit ≥ 0.05 .

Steps deleted in the age calculation (cf. Table 1) are (1) small steps that are only few time the background, hence with overly large errors. These steps have no weight in the calculation and they only artificially decrease the MSWD hence making the data looking less scatter than what they really are, and (2) steps that failed to form an isochron in sample LO-13-1-1R_3 were 35% of the gas was not include in the calculation. . Steps deletion results in ~10% of the total gas of all experiments deleted in the final age calculation of Batch 2. If sample LO-13-1-1R_3 is entirely excluded, then the steps removed would consist in 2-3% of the total gas due to too small steps.

Finally, All the plateau and inverse isochron ages were individually recalculated using the new decay constants determined by [Renne et al. \(2010\)](#) and an age of 1.2061 ± 0.0019 ($\pm 0.16\%$, 1σ) for ACs. Recalculated values are shown in Table 1.

INVERSE ISOCHRON APPROACH AND SIGNIFICANCE OF THE TRAPPED $^{40}\text{Ar}^*$.

The inverse isochron approach is particularly useful as it eliminates the need to assume an initial (trapped) isotopic Ar composition (e.g., [Jourdan et al., 2007, 2008, 2009](#) and numerous references inside). In this study, the composition of the dominant trapped component is of atmospheric composition as shown by the inverse isochron $^{40}\text{Ar}/^{36}\text{Ar}$ intercepts giving value around 295.5. Is a third component consisting of inherited (undegassed) $^{40}\text{Ar}^*$ occur in our samples as well? A two components mixing (trapped $^{40}\text{Ar} +$ radiogenic $^{40}\text{Ar}_K$) generates a well-defined mixing line whereas more adding components (excess ^{40}Ar) would be represented by at least a triangular distribution of the data point (three components mixing) in the inverse isochron plot and would evidently scatter the data. Heterogeneous excess Ar would also produce different ages from our four samples due to different concentration, due in turn to different time-temperature histories after the impact.

Generally speaking, the gaseous inherited $^{40}\text{Ar}^*$ is distributed more or less homogeneously in a melt (due to near complete isotopic re-equilibration during the melting phase) and will degas constantly during the step heating experiment. On the other hand, the radiogenic $^{40}\text{Ar}^*$ is associated to K-rich sites which have a more restricted location in the melt and narrower activation energy and will degas in a narrower region of temperature. Hence, for young rocks, excess ^{40}Ar would not cluster near the radiogenic axis but would be partially distributed, along the mixing line, and would be identified by the inverse isochron approach.

References Appendix DR1

- Jourdan, F., Renne, P.R., and Reimold, W.U., 2007, The problem of inherited $^{40}\text{Ar}^*$ in dating impact glass by $^{40}\text{Ar}/^{39}\text{Ar}$ geochronology: Evidence from the Tswaing crater (South Africa): *Geochimica et Cosmochimica Acta*, v. 71, p. 1214–1231, doi:10.1016/j.gca.2006.11.013.
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- Jourdan, F., Renne, P.R., and Reimold, U.W., 2009, An appraisal of the ages of terrestrial impact structures: *Earth and Planetary Science Letters*, v. 286, p. 1–13, doi:10.1016/j.epsl.2009.07.009.
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- Nomade S., Renne P. R., Vogel N., Sharp W. D., Becker T. A., Jaouni A. B. and Mundil R. 2005. Alder Creek Sanidine (ACs-2): a quaternary $^{40}\text{Ar}/^{39}\text{Ar}$ standard tied to the Cobb Mountain geomagnetic event. *Chem. Geol.* 218, 315–338.
- Renne, P.R. Mundil, R. Balco, G., Min, K., Ludwig, K.R. 2010. Joint determination of ^{40}K decay constants and $^{40}\text{Ar}^*/^{40}\text{K}$ for the Fish Canyon sanidine standard, and improved accuracy for $^{40}\text{Ar}/^{39}\text{Ar}$ geochronology. *Geochimica et Cosmochimica Acta* 74, 5349–5367.
- Steiger, R.H., Jager, E. 1977. Subcommission on geochronology: Convention on the use of decay constants in geo- and cosmo-chemistry, *Earth Planet. Sci. Lett.*, 36, 91–106.



Figure DR1: Basaltic impact melt rocks of Lonar crater.

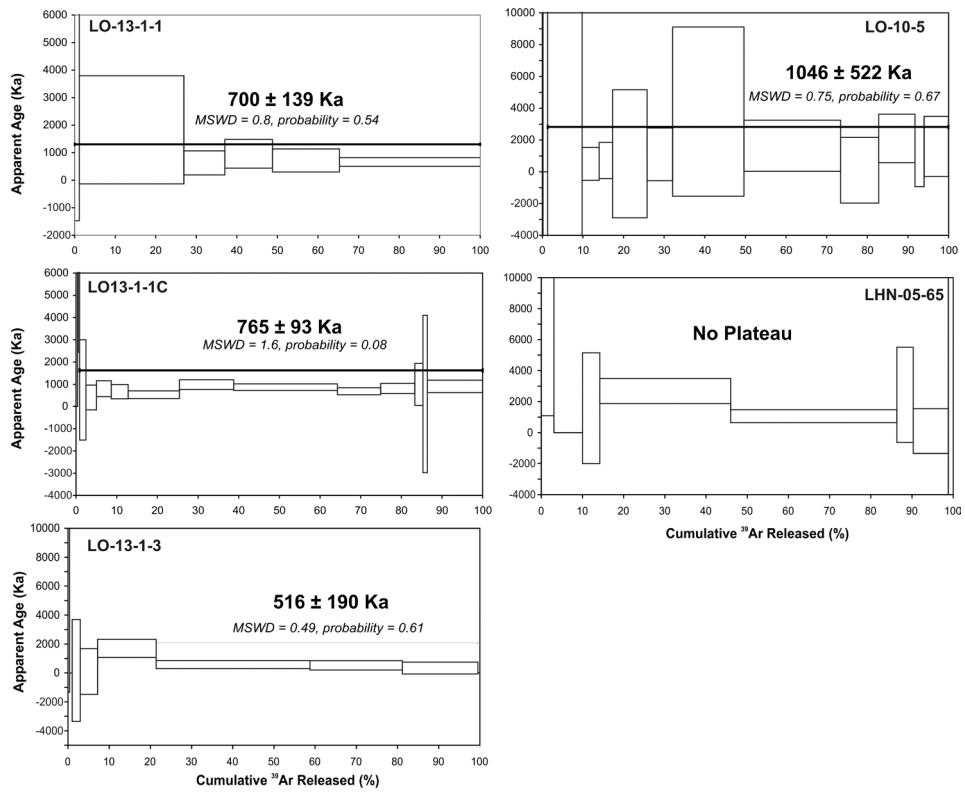


Figure DR2a: $^{40}\text{Ar}/^{39}\text{Ar}$ step-heating age spectra of the four samples from batch 1. Plateau ages are provided at the 2σ confidence level. Ages have been calculated using the decay constants and ACs standard age recommended by [Renne et al. \(2010\)](#). Note that the accuracy of the data from this batch might be slightly compromised due to poor Ca-interference corrections.

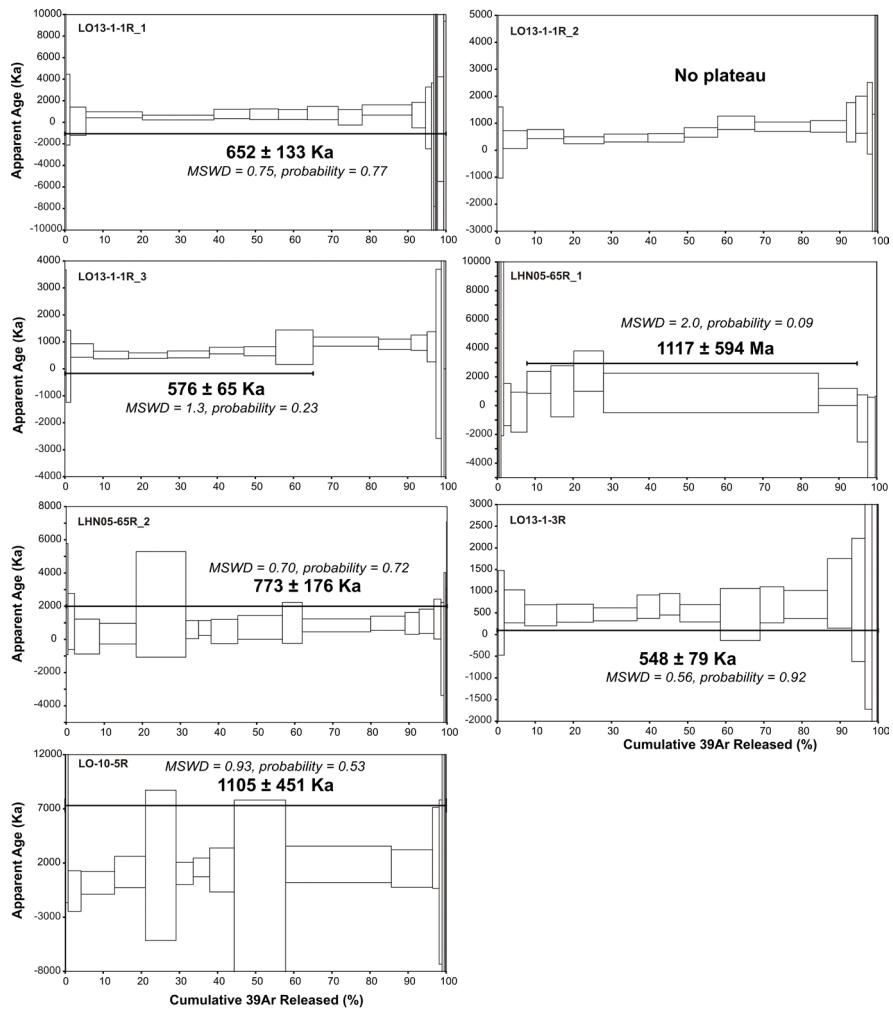


Figure DR2b: $^{40}\text{Ar}/^{39}\text{Ar}$ step-heating age spectra of samples from Batch 2. Plateau ages are provided at the 2σ confidence level. Ages have been calculated using the decay constants and ACs standard age recommended by [Renne et al. \(2010\)](#).

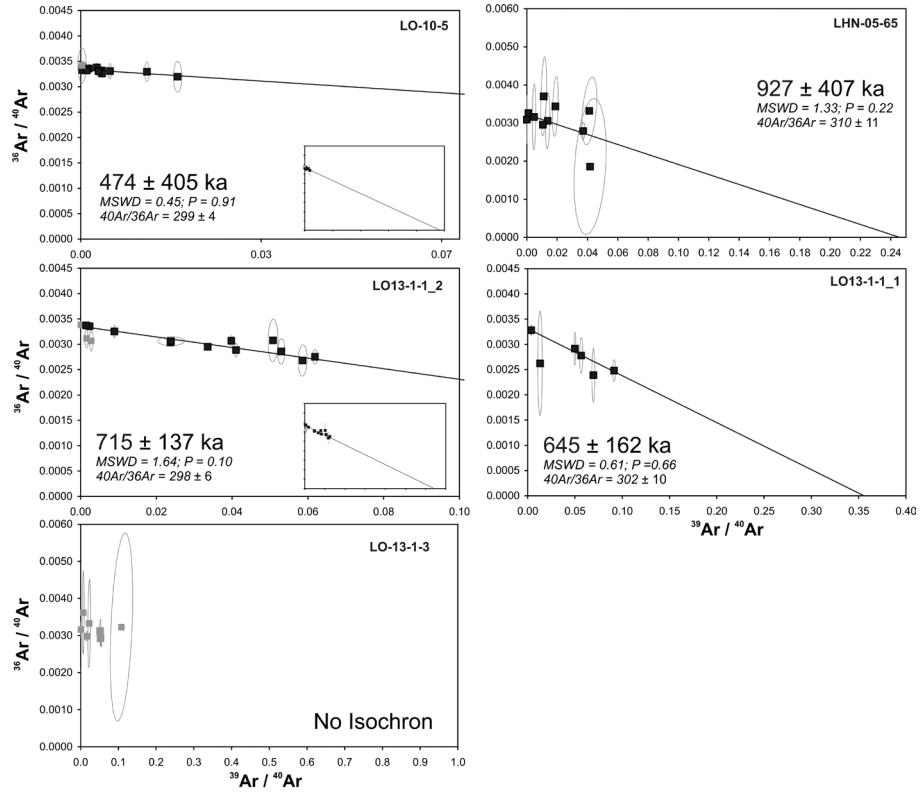


Figure DR3a: Inverse isochron plot of $^{36}\text{Ar}/^{40}\text{Ar}$ vs. $^{39}\text{Ar}/^{40}\text{Ar}$ for step-heating experiments obtained on samples from batch 1. Isochron ages and $^{40}\text{Ar}/^{36}\text{Ar}$ intercept are given at 2σ . The dark squares represent data included in the isochron calculation whereas grey squares correspond to data omitted in the calculation. Inset graphs represent the same isochrons with scales adapted to show the two intercepts and the data spread along the line. Note that the accuracy of the data from this batch might be slightly compromised due to poor Ca-interference corrections.

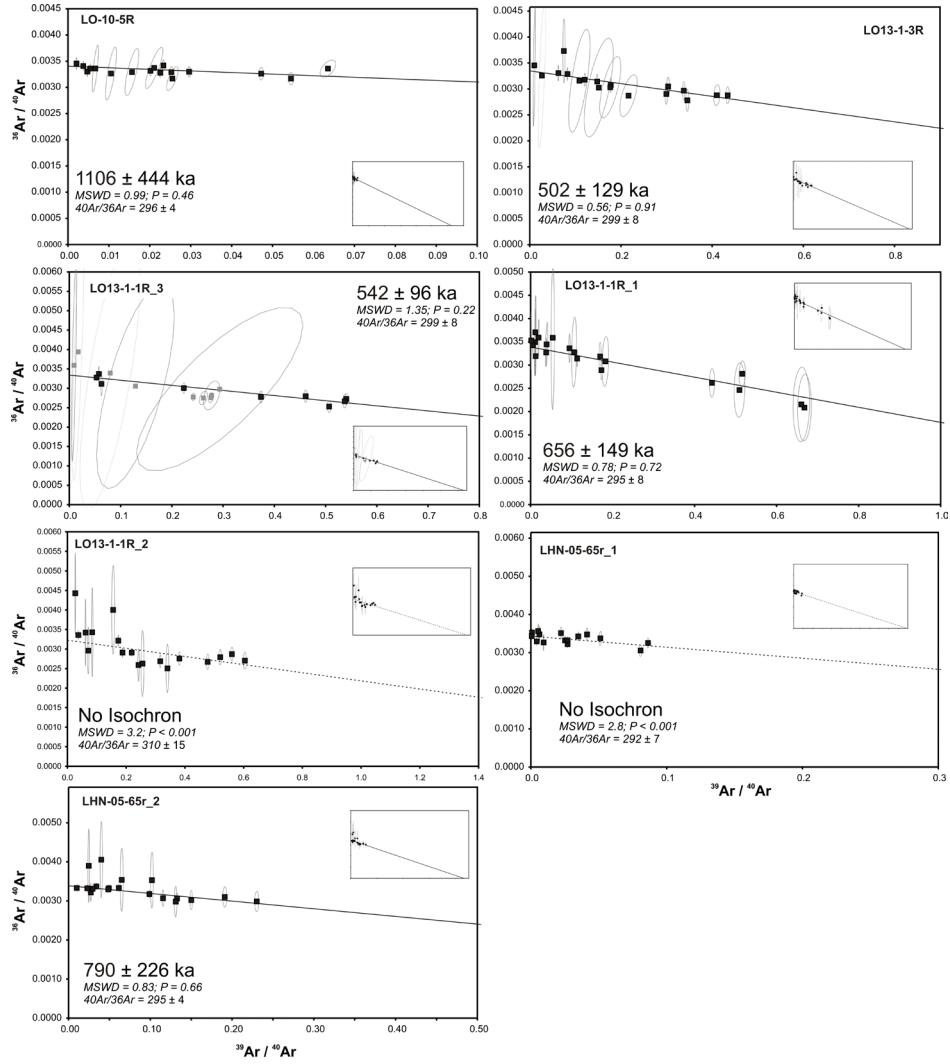


Figure DR3b: Inverse isochron plot of $^{36}\text{Ar}/^{40}\text{Ar}$ vs. $^{39}\text{Ar}/^{40}\text{Ar}$ for step-heating experiments obtained on samples from batch 2. Isochron ages and $^{40}\text{Ar}/^{36}\text{Ar}$ intercept are given at 2σ . The dark squares represent data included in the isochron calculation whereas grey squares correspond to data omitted in the calculation. Inset graphs represent the same isochrons with scales adapted to show the two intercepts and the data spread along the line.

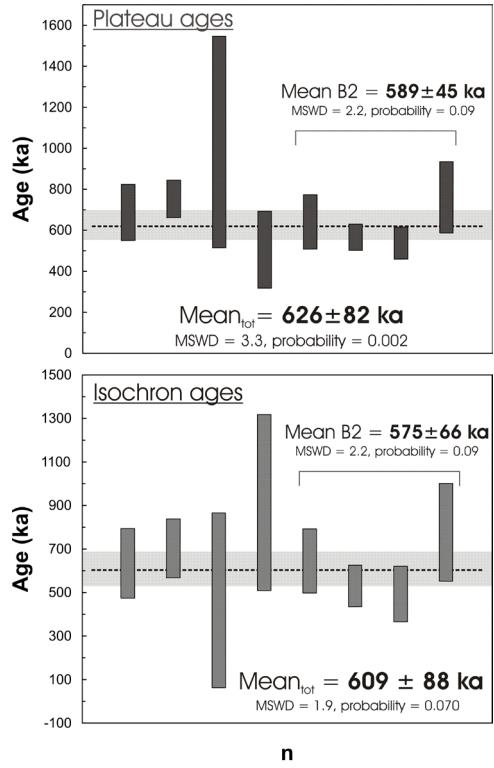


Figure DR4: Weighted mean age of individual plateau and isochron ages for all analyses and for batch 2 only. MSWD and P values are indicated. Uncertainties correspond to error on the weighted mean (2σ) only.

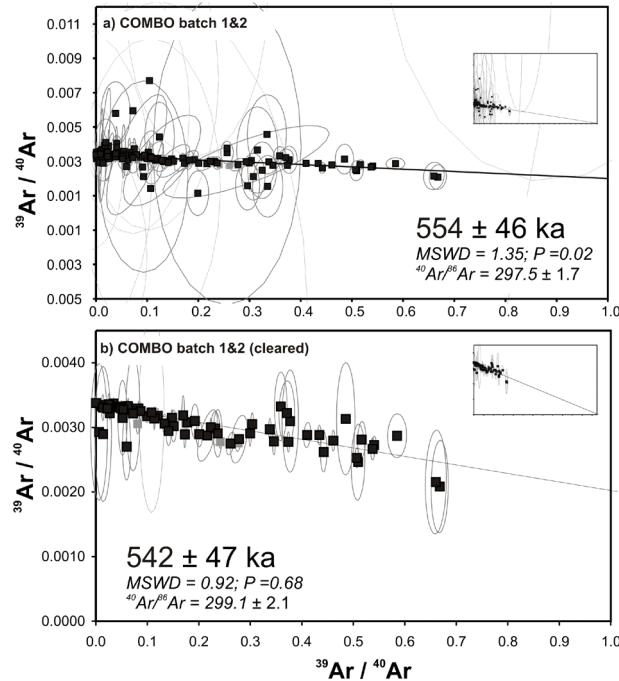


Figure DR5: Inverse isochron plot of $^{36}\text{Ar}/^{40}\text{Ar}$ vs. $^{39}\text{Ar}/^{40}\text{Ar}$ of all experiments of the two batches combined in a single global isochron for each batch. Isochron ages and $^{40}\text{Ar}/^{36}\text{Ar}$ intercepts are given at 2σ . The dark squares represent data included in the isochron calculation whereas grey squares correspond to data omitted in the calculation. Inset graphs represent the

same isochrons with scale adapted to show the two intercepts and the data spread along the line. a) All analyses from the two batches. The apparent “age” is given as indication only as the data do not meet the criteria of a valid isochron ($P \geq 0.05$). b) Analyses from both batches cleared from steps with relatively large errors. These plots are for information only as the results from batch 1 might be compromised by inappropriate Ca interferences corrections on ^{36}Ar and ^{39}Ar .

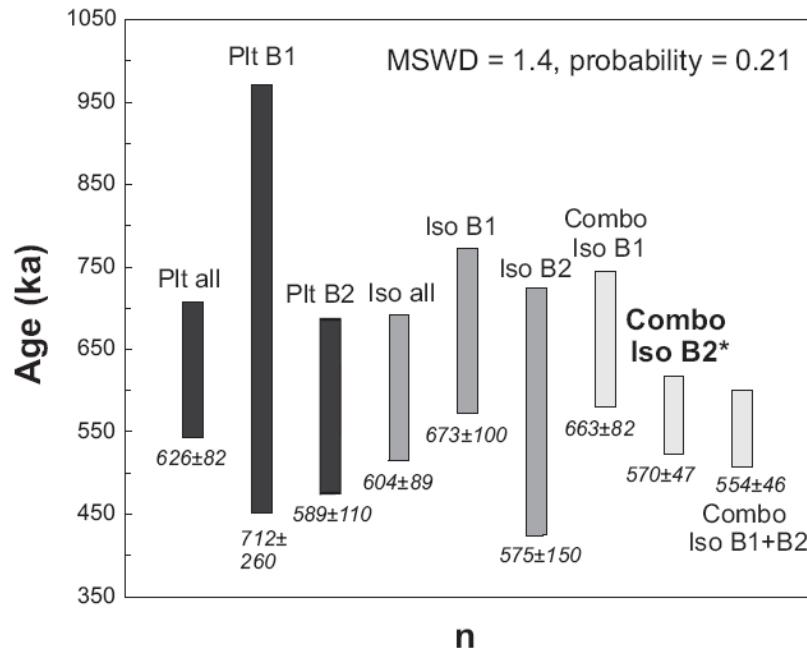


Figure DR6. Plots showing the apparent ages obtained using different data combination schemes. Plt: weighted mean of plateau ages (Fig. DR4); Iso: weighted mean of isochron ages (Fig. DR4); Combo Iso: global isochron (cf. Fig. 2 and DR5); B1: Batch 1; B2: Batch 2. * indicate the best age estimate for Lonar impact (cf. discussion in the text). MSWD (1.4) and P (0.21) statistical tests are indicated and show that the different methods of calculation yield concordant results. The error on each of the weighted mean age is the classical age error calculation. When $P < 0.15$, the age error has been expended by student's t and the square root of the MSWD ($\sigma_{\text{Age}} = t\sigma_{\text{wm}} \sqrt{\text{MSWD}}$), where student's t takes into account the number of observations, σ_{wm} is the error propagated from the weighted mean, and MSWD is the mean square of the weighted deviates (cf. detail in Jourdan et al., 2008).

Table DR1. Detailed methodological description and complete dataset generated by the ArArCalc software (Koppers et al., 2002) for each sample of irradiation 1.

Table DR2. Detailed methodological description and complete dataset generated by the ArArCalc software (Koppers et al., 2002) for each sample of irradiation 2.

Table DR1. Detailed methodological description and complete dataset generated by the ArArCalc software (Koppers et al., 2002) for each sample of irradiation 1.

Sample LO13-1-1_1										
Intercept Values	36Ar	1σ	37Ar	1σ	38Ar	1σ	39Ar	1σ	40Ar	1σ
9A4428D	60.00 W	0.000065	0.000004	0.000028	0.000006	0.000020	0.000007	0.000266	0.000006	0.021991
9A4429D-1	65.00 W	0.004861	0.000017	0.000041	0.000003	0.001031	0.000014	0.005454	0.000029	1.444799
9A4430D	61.00 W	0.000158	0.000003	0.000028	0.000004	0.000053	0.000004	0.002141	0.000007	0.048381
9A4450D	63.00 W	0.000103	0.000007	0.000029	0.000004	0.000047	0.000005	0.002479	0.000015	0.039509
9A4451D	65.00 W	0.000197	0.000005	0.000037	0.000007	0.000085	0.000007	0.003500	0.000037	0.065039
9A4452D	68.00 W	0.000216	0.000004	0.000024	0.000004	0.000128	0.000006	0.007252	0.000046	0.083071
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Incremental Heating	36Ar(a)	37Ar(ca)	38Ar(cl)	39Ar(k)	40Ar(r)	Age ± 2σ (Ka)		40Ar(r) (%)	39Ar(k) (%)	K/Ca ± 2σ
9A4428D	60.00 W	■	0.000046	0.000000	0.000007	0.000229	0.003929	3885.0 ± 5357.8	22.43	1.10
9A4429D-1	65.00 W	■	0.004721	0.059869	0.000054	0.005365	0.043275	1831.2 ± 1964.3	3.01	25.83
9A4430D	61.00 W	■	0.000122	0.010229	0.000000	0.002095	0.005797	628.4 ± 436.2	13.82	10.09
9A4450D	63.00 W	■	0.000084	0.00261	0.000000	0.002439	0.010306	959.6 ± 522.6	29.37	11.74
9A4451D	65.00 W	■	0.000169	0.029336	0.000002	0.003437	0.010833	715.7 ± 417.9	17.85	16.55
9A4452D	68.00 W	■	0.000196	0.000000	0.000001	0.007203	0.021021	662.8 ± 158.2	26.67	34.68
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Σ	0.005337	0.099726	0.000063	0.020768	0.095160					
Information on Analysis	Results	40(r)/39(k) ± 2σ			Age ± 2σ (Ka)		Σ	39Ar(k) (%,n)	K/Ca ± 2σ	
LO-13-1-1	Weighted Plateau	3.0488	± 0.5945	± 19.50%	692.3	± 136.6	0.81	100.00	0.030 ± 0.014	
Glass						± 19.73%		6		
discC										
FJ										
Project = Lunar crater										
Irradiation = 11-20mn										
J = 0.0001259 ± 0.0000019										
ACs = 1.193 ± 0.001 Ma										
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Sample LO13-1-1_2	36Ar	1σ	37Ar	1σ	38Ar	1σ	39Ar	1σ	40Ar	1σ
9A4868D	550 °C	0.035478	0.000147	0.000284	0.000011	0.006751	0.000043	0.000872	0.000066	10.512505
9A4869D	580 °C	0.000764	0.000008	0.000267	0.000007	0.000159	0.000035	0.000365	0.000016	0.218963
9A4870D	650 °C	0.000828	0.000012	0.000273	0.000012	0.000168	0.000003	0.000687	0.000022	0.243001
9A4871D	750 °C	0.004468	0.000018	0.000283	0.000008	0.000880	0.000012	0.003148	0.000030	1.312587
9A4872D	800 °C	0.000439	0.000006	0.000252	0.000016	0.000144	0.000003	0.005191	0.000017	0.120249
9A4873D	880 °C	0.000487	0.000007	0.000298	0.000009	0.000178	0.000007	0.007270	0.000027	0.141368
9A4874D	940 °C	0.000598	0.000009	0.000290	0.000006	0.000234	0.000006	0.008294	0.000043	0.174589
9A4875D	1000 °C	0.002083	0.000016	0.000284	0.000009	0.000709	0.000012	0.025110	0.000108	0.651367
9A4876D	1100 °C	0.003540	0.000016	0.000281	0.000010	0.000999	0.000017	0.026530	0.000077	1.140036
9A4877D	1150 °C	0.004607	0.000026	0.000276	0.000016	0.001486	0.000018	0.050658	0.000194	1.535981
9A4878D	1200 °C	0.001090	0.000007	0.000229	0.000018	0.000474	0.000009	0.021143	0.000070	0.364869
9A4879D	1300 °C	0.001333	0.000013	0.000199	0.000017	0.000470	0.000007	0.016673	0.000040	0.432403
9A4880D	1400 °C	0.001625	0.000012	0.000260	0.000016	0.000365	0.000013	0.004000	0.000021	0.474371
9A4881D	1500 °C	0.005012	0.000016	0.000217	0.000012	0.000995	0.000018	0.002156	0.000030	1.473520
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Incremental Heating	36Ar(a)	37Ar(ca)	38Ar(cl)	39Ar(k)	40Ar(r)	Age ± 2σ (Ka)		40Ar(r) (%)	39Ar(k) (%)	K/Ca ± 2σ
9A4868D	550 °C	0.035531	0.102748	0.000061	0.000787	0.000000	0.0 ± 0.0	0.00	0.39	0.003 ± 0.004
9A4869D	580 °C	0.000630	0.049151	0.000000	0.000317	0.016004	11418.8 ± 8854.0	7.91	0.16	0.003 ± 0.006
9A4870D	650 °C	0.000693	0.056948	0.000000	0.000636	0.021068	7510.9 ± 5072.9	9.32	0.32	0.005 ± 0.011
9A4871D	750 °C	■	0.004348	0.075544	0.000000	0.003095	0.010148	744.5 ± 2255.9	0.78	1.55
9A4872D	800 °C	■	0.000315	0.000000	0.000000	0.005203	0.009239	403.3 ± 559.9	9.02	2.61
9A4873D	880 °C	■	0.000330	0.110384	0.000000	0.007212	0.025546	804.4 ± 356.6	20.76	3.62
9A4874D	940 °C	■	0.000446	0.085485	0.000000	0.008259	0.024163	664.4 ± 320.8	15.50	4.14
9A4875D	1000 °C	■	0.001940	0.068558	0.000000	0.025160	0.058821	530.9 ± 169.0	9.30	12.63
9A4876D	1100 °C	■	0.003400	0.061095	0.000000	0.026592	0.115013	982.1 ± 217.6	10.27	13.34
9A4877D	1150 °C	■	0.004472	0.049645	0.000000	0.050832	0.193338	863.7 ± 152.2	12.76	25.51
9A4878D	1200 °C	■	0.000945	0.000000	0.000002	0.021225	0.063880	683.5 ± 157.6	18.62	10.65
9A4879D	1300 °C	■	0.001178	0.000000	0.000005	0.016733	0.059840	812.1 ± 225.0	14.67	8.40
9A4880D	1400 °C	■	0.001449	0.030116	0.000000	0.003980	0.017387	992.0 ± 94.1	3.90	2.00
9A4881D	1500 °C	■	0.004850	0.000000	0.000009	0.002146	0.005285	559.3 ± 3536.0	0.37	1.08
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Σ	0.064004	0.705492	0.000079	0.199276	0.727726					
Information on Analysis	Results	40(r)/39(k) ± 2σ			Age ± 2σ (Ka)		Σ	39Ar(k) (%,n)	K/Ca ± 2σ	
LO-13-1-1	Weighted Plateau	3.3346	± 0.4031	± 12.09%	757.3	± 91.8	1.63	99.13	0.029 ± 0.018	
Glass						± 12.13%		12		
Furnace										
FJ										
Project = Lunar crater										
Irradiation = 11-20mn										
J = 0.0001259 ± 0.000006										
ACs = 1.193 ± 0.001 Ma										
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Project = Lunar crater	Total Fusion Age	3.6515	± 0.4144	± 11.35%	829.3	± 94.5	15	0.121 ± 0.084		
Irradiation = 11-20mn						± 11.39%				
J = 0.0001259 ± 0.000006										
ACs = 1.193 ± 0.001 Ma										

Table DR1. Detailed methodological description and complete dataset generated by the ArArCalc software (Koppers et al., 2002) for each sample of irradiation 1.

Sample LO10-5

Intercept Values	36Ar	1σ	37Ar	1σ	38Ar	1σ	39Ar	1σ	40Ar	1σ	
9A4908D	550 °C	0.008573	0.000034	0.000259	0.000010	0.001628	0.000016	0.000249	0.000009	2.517247	0.001392
9A4909D	650 °C	0.007500	0.000031	0.000244	0.000011	0.001434	0.000007	0.000902	0.000014	2.182094	0.000404
9A4910D	750 °C	0.029955	0.000044	0.000247	0.000011	0.005688	0.000022	0.002903	0.000026	9.002558	0.004841
9A4911D	815 °C	0.000986	0.000009	0.000260	0.000013	0.000223	0.000008	0.003228	0.000021	0.278804	0.000356
9A4912D	879 °C	0.000565	0.000008	0.000261	0.000010	0.000145	0.000004	0.002503	0.000026	0.155358	0.000244
9A4913D	930 °C	0.014591	0.000052	0.000278	0.000005	0.002842	0.000035	0.006510	0.000034	4.343995	0.002776
9A4914D	1000 °C	0.004173	0.000020	0.000256	0.000011	0.000838	0.000015	0.004773	0.000032	1.241648	0.000473
9A4915D	1050 °C	0.016087	0.000044	0.000264	0.000010	0.003098	0.000024	0.005670	0.000045	4.821761	0.002673
9A4916D	1103 °C	0.016667	0.000038	0.000277	0.000008	0.003379	0.000026	0.010806	0.000060	5.060494	0.002057
9A4917D	1154 °C	0.008289	0.000027	0.000267	0.000008	0.001644	0.000013	0.007145	0.000046	2.443189	0.002129
9A4918D	1200 °C	0.005734	0.000018	0.000252	0.000013	0.001184	0.000014	0.006776	0.000042	1.743659	0.001180
9A4919D	1285 °C	0.001194	0.000007	0.000255	0.000009	0.000247	0.000008	0.001724	0.000010	0.339740	0.000396
9A4920D	1400 °C	0.004735	0.000016	0.000231	0.000009	0.000956	0.000011	0.004563	0.000021	1.418205	0.000739
9A4921D	1500 °C	0.000548	0.000004	0.000234	0.000007	0.000113	0.000004	0.000052	0.000004	0.144663	0.000158

Incremental Heating	36Ar(a)	37Ar(ca)	38Ar(cl)	39Ar(k)	40Ar(r)	Age ± 2σ (Ka)	40Ar(r) (%)	39Ar(k) (%)	K/Ca ± 2σ	
9A4908D	550 °C	0.008468	0.126766	0.000000	0.000149	0.000246	375.7 ± 104831.7	0.01	0.19	0.001 ± 0.001
9A4909D	650 °C	0.007414	0.034349	0.000000	0.000871	0.000000	0.0 ± 0.0	0.00	1.14	0.011 ± 0.041
9A4910D	750 °C	0.074864	1.111124	0.000000	0.006465	0.368881	12924.5 ± 20105.6	1.64	8.47	0.003 ± 0.001
9A4911D	815 °C	0.000867	0.014609	0.000000	0.003219	0.007052	497.9 ± 1042.3	2.68	4.22	0.095 ± 0.885
9A4912D	879 °C	0.000447	0.000000	0.000000	0.002501	0.007755	704.7 ± 1137.9	5.55	3.28	0.004 ± 0.002
9A4913D	930 °C	0.014538	0.032044	0.000012	0.006502	0.032317	1129.5 ± 4032.1	0.75	8.52	0.087 ± 0.315
9A4914D	1000 °C	0.040470	0.000000	0.000000	0.004782	0.023002	1093.1 ± 1663.4	1.88	6.27	0.002 ± 0.001
9A4915D	1050 °C	0.039982	1.149858	0.000000	0.013387	0.223267	3787.2 ± 5324.1	1.85	17.54	0.005 ± 0.001
9A4916D	1103 °C	0.016626	0.000000	0.000027	0.018154	0.130637	1635.0 ± 1611.5	2.59	23.79	0.048 ± 0.014
9A4917D	1154 °C	0.008199	0.000000	0.000000	0.007168	0.002951	93.6 ± 2070.6	0.12	9.39	0.021 ± 0.007
9A4918D	1200 °C	0.005628	0.000000	0.000020	0.006798	0.062690	2095.0 ± 1527.9	3.63	8.91	0.024 ± 0.011
9A4919D	1285 °C	0.001058	0.000000	0.000000	0.001724	0.007254	956.1 ± 1885.1	2.27	2.26	0.006 ± 0.002
9A4920D	1400 °C	0.004609	0.000000	0.000006	0.004571	0.032037	1592.6 ± 1890.6	2.30	5.99	0.023 ± 0.012
9A4921D	1500 °C	0.000392	0.000000	0.000000	0.000027	0.000000	0.0 ± 0.0	0.00	0.04	0.000 ± 0.000

Σ 0.187162 2.468752 0.000066 0.076316 0.898089

Information on Analysis	Results	40(r)/39(k) ± 2σ	Age ± 2σ (Ka)	M	39Ar(k) (%,n)	K/Ca ± 2σ
LO-10-5	Weighted Plateau	4.5564 ± 2.2696	1035.4 ± 515.7	0.75	98.63	
Glass		± 49.81%	± 49.81%		11	
Furnace						0.003 ± 0.002
FJ	MSWD = 0.75, probability = 0.67		External Error ± 515.7	2.23	Statistical T Ratio	
			Analytical Error ± 515.6	1.0000	Error Magnification	
Project = Lonar crater						
Irradiation = 11-20mn						
J = 0.0001260 ± 0.000006	Total Fusion Age	11.7680 ± 9.0254	2673.0 ± 2048.7	14	0.013 ± 0.003	
ACs = 1.193 ± 0.001 Ma		± 76.69%	± 76.64%			
			External Error ± 2048.8			
			Analytical Error ± 2048.6			

Sample LO13-1-3

Intercept Values	36Ar	1σ	37Ar	1σ	38Ar	1σ	39Ar	1σ	40Ar	1σ	
9A5194D	550 °C	0.000570	0.000010	0.000169	0.000010	0.000114	0.000005	0.000121	0.000004	0.156993	0.000164
9A5195D	650 °C	0.000176	0.000005	0.000170	0.000011	0.000041	0.000003	0.000171	0.000006	0.031819	0.000079
9A5196D	800 °C	0.000173	0.000007	0.000176	0.000010	0.000046	0.000003	0.000539	0.000011	0.032461	0.000056
9A5197D	950 °C	0.000128	0.000006	0.000132	0.000010	0.000047	0.000004	0.001140	0.000017	0.020511	0.000069
9A5198D	1050 °C	0.000815	0.000012	0.000177	0.000006	0.000215	0.000005	0.003812	0.000037	0.248011	0.000155
9A5199D	1130 °C	0.000678	0.000014	0.000213	0.000016	0.000257	0.000007	0.010366	0.000026	0.199442	0.000260
9A5200D	1200 °C	0.000426	0.000009	0.000187	0.000007	0.000167	0.000006	0.006008	0.000041	0.119843	0.000103
9A5201D	1300 °C	0.000415	0.000008	0.000167	0.000012	0.000147	0.000003	0.004899	0.000040	0.111356	0.000170
9A5202D	1400 °C	0.000145	0.000004	0.000194	0.000010	0.000039	0.000004	0.000138	0.000006	0.026161	0.000070
9A5203D	1500 °C	0.000139	0.000005	0.000156	0.000018	0.000040	0.000004	0.000020	0.000003	0.024563	0.000080

Intercept Values	36Ar(a)	37Ar(ca)	38Ar(cl)	39Ar(k)	40Ar(r)	Age ± 2σ (Ka)	40Ar(r) (%)	39Ar(k) (%)	K/Ca ± 2σ	
9A5194D	550 °C	0.000470	0.000000	0.000112	0.009739	19482.5 ± 20819.8	6.55	0.42		
9A5195D	650 °C	0.000087	0.000000	0.000162	0.000000	0.0 ± 0.0	0.00	0.61		
9A5196D	800 °C	0.000076	0.015240	0.000000	0.000520	0.000395	171.5 ± 3521.3	1.72	1.95	0.015 ± 0.061
9A5197D	950 °C	0.000034	0.000000	0.000003	0.001132	0.000489	97.4 ± 1579.9	4.66	4.24	
9A5198D	1050 °C	0.000710	0.025846	0.000005	0.003789	0.028445	1692.0 ± 625.7	11.93	14.19	0.063 ± 0.134
9A5199D	1130 °C	0.000555	0.089301	0.000000	0.009975	0.025624	579.2 ± 278.2	13.50	37.35	0.048 ± 0.045
9A5200D	1200 °C	0.000321	0.017648	0.000004	0.005994	0.014005	526.8 ± 324.5	12.85	22.44	0.146 ± 0.470
9A5201D	1300 °C	0.000296	0.000000	0.000003	0.004897	0.007306	336.4 ± 408.1	7.70	18.34	0.146 ± 0.470
9A5202D	1400 °C	0.000000	0.018764	0.000000	0.000115	0.000000	0.0 ± 0.0	0.00	0.43	0.003 ± 0.009
9A5203D	1500 °C	0.000000	0.000000	0.000011	0.000000	0.000000	0.0 ± 0.0	0.00	0.04	0.001 ± 0.001

Σ 0.002551 0.166801 0.000015 0.026708 0.086002

Information on Analysis	Results	40(r)/39(k) ± 2σ	Age ± 2σ (Ka)	M	39Ar(k) (%,n)	K/Ca ± 2σ
LO-13-1-3	Weighted Plateau	2.2636 ± 0.8321	510.4 ± 187.8	0.49	78.13	
Glass		± 36.76%	± 36.79%		3	
Laser			External Error ± 187.8	4.30	Statistical T Ratio	
FJ	MSWD = 0.49, probability = 0.61		Analytical Error ± 187.6	1.0000	Error Magnification	
Project = Lonar crater						
Irradiation = 11-20mn						
J = 0.0001250 ± 0.000010	Total Fusion Age	3.2201 ± 0.9445	726.0 ± 213.2	10	0.069 ± 0.090	
ACs = 1.193 ± 0.001 Ma		± 29.33%	± 29.37%			

Table DR1. Detailed methodological description and complete dataset generated by the ArArCalc software (Koppers et al., 2002) for each sample of irradiation 1.

Sample LHN-05-65

Intercept Values	36Ar	1σ	37Ar	1σ	38Ar	1σ	39Ar	1σ	40Ar	1σ	
9A5174D	596 °C	0.001302	0.000012	0.000179	0.000007	0.000258	0.000007	0.000387	0.000014	0.376761	0.000323
9A5175D	700 °C	0.000171	0.000007	0.000152	0.000009	0.000041	0.000002	0.000253	0.000006	0.030256	0.000093
9A5176D	800 °C	0.000205	0.000009	0.000176	0.000008	0.000051	0.000004	0.000618	0.000008	0.041490	0.000120
9A5177D	900 °C	0.000219	0.000009	0.000195	0.000014	0.000057	0.000003	0.000549	0.000010	0.047311	0.000117
9A5178D	1000 °C	0.001194	0.000019	0.000178	0.000008	0.000297	0.000008	0.003908	0.000029	0.378071	0.000275
9A5179D	1100 °C	0.000478	0.000012	0.000204	0.000006	0.000156	0.000005	0.004977	0.000045	0.142459	0.000131
9A5180D	1200 °C	0.000125	0.000006	0.000194	0.000012	0.000044	0.000004	0.000507	0.000008	0.022513	0.000094
9A5181D	1300 °C	0.000202	0.000006	0.000185	0.000013	0.000061	0.000005	0.001049	0.000014	0.041667	0.000119
9A5182D	1400 °C	0.000260	0.000009	0.000173	0.000012	0.000056	0.000006	0.000153	0.000007	0.060078	0.000066
9A5183D	1500 °C	0.000379	0.000009	0.000171	0.000007	0.000079	0.000004	0.000011	0.000003	0.095094	0.000076

Incremental Heating	36Ar(a)	37Ar(ca)	38Ar(cl)	39Ar(k)	40Ar(r)	Age ± 2σ (Ka)	40Ar(r) (%)	39Ar(k) (%)	K/Ca ± 2σ		
9A5174D	596 °C	■	0.001204	0.000000	0.000000	0.000378	0.013217	7863.8 ± 6776.8	3.58	3.09	0.216 ± 17.962
9A5175D	700 °C	■	0.000081	0.000000	0.000000	0.000244	0.000000	0.0 ± 0.0	0.00	1.99	
9A5176D	800 °C	■	0.000110	0.007841	0.000000	0.000604	0.000000	0.0 ± 0.0	0.00	4.93	0.033 ± 0.132
9A5177D	900 °C	■	0.000114	0.037993	0.000000	0.000513	0.003570	1569.2 ± 3573.7	9.58	4.19	0.006 ± 0.007
9A5178D	1000 °C	■	0.001089	0.017486	0.000017	0.003890	0.046281	2680.9 ± 803.9	12.57	31.77	0.096 ± 0.178
9A5179D	1100 °C	■	0.000371	0.040425	0.000000	0.004944	0.023259	1060.7 ± 419.5	17.50	40.38	0.053 ± 0.038
9A5180D	1200 °C	■	0.000022	0.018079	0.000004	0.000485	0.005243	2434.6 ± 3069.3	45.12	3.96	0.012 ± 0.024
9A5181D	1300 °C	■	0.000084	0.000000	0.000004	0.001041	0.000475	102.9 ± 1446.3	1.88	8.50	0.034 ± 0.204
9A5182D	1400 °C	■	0.000096	0.000000	0.000001	0.000144	0.002003	3123.1 ± 12223.9	6.61	1.18	0.034 ± 0.204
9A5183D	1500 °C	■	0.000123	0.006970	0.000007	0.000000	0.003460	242299.4 ± 0.0	8.72	0.00	0.000 ± 0.000

Σ	0.003294	0.128794	0.000033	0.012244	0.097509				
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Information on Analysis	Results	40(r)/39(k) ± 2σ	Age ± 2σ (Ka)	MS	39Ar(k) (%,n)	K/Ca ± 2σ
LHN-05-65	Weighted Plateau	115.9672 ± 0.6325 ± 0.55%	25964.0 ± 435.8 ± 1.68%	0.00	100.00 10	78.487 ± 0.632
Glass			External Error ± 445.7	2.26	Statistical T Ratio	
Laser			Analytical Error ± 140.6	1.0000	Error Magnification	
FJ						
Project = Lonar crater	Total Fusion Age	7.9638 ± 2.1293 ± 26.74%	1795.0 ± 480.6 ± 26.77%	10	0.041 ± 0.035	
Irradiation = 11-20mm			External Error ± 480.6			
J = 0.0001250 ± 0.0000010			Analytical Error ± 479.7			
ACs = 1.193 ± 0.001 Ma						

Table DR2. Detailed methodological description and complete dataset generated by the ArArCalc software (Koppers et al., 2002) for each sample of irradiation 2.

Sample LO-13-1-1R_1											
Intercept Values	36Ar	1σ	37Ar	1σ	38Ar	1σ	39Ar	1σ	40Ar	1σ	
0B9334D	600 °C	0.000218	0.000009	0.000810	0.000022	0.000061	0.000007	0.001007	0.000021	0.046015	0.000221
0B9335D	700 °C	0.000420	0.000006	0.002088	0.000030	0.000113	0.000007	0.003138	0.000045	0.110305	0.000366
0B9336D	800 °C	0.000610	0.000016	0.009399	0.000061	0.000280	0.000009	0.012606	0.000094	0.160609	0.000375
0B9337D	900 °C	0.000483	0.000010	0.035351	0.000118	0.000630	0.000019	0.044459	0.000139	0.129004	0.000280
0B9338D	1000 °C	0.000556	0.000009	0.045849	0.000227	0.000821	0.000019	0.056520	0.000110	0.139164	0.000550
0B9339D	1025 °C	0.000292	0.000011	0.023567	0.000116	0.000409	0.000014	0.028311	0.000071	0.072857	0.000203
0B9340D	1050 °C	0.000271	0.000009	0.019378	0.000107	0.000346	0.000013	0.022729	0.000106	0.065516	0.000175
0B9341D	1075 °C	0.000311	0.000007	0.019890	0.000065	0.000377	0.000021	0.022774	0.000104	0.076447	0.000249
0B9342D	1100 °C	0.000879	0.000012	0.021689	0.000130	0.000479	0.000013	0.024318	0.000089	0.245541	0.000290
0B9343D	1125 °C	0.000554	0.000012	0.016261	0.000103	0.000363	0.000016	0.018921	0.000106	0.144676	0.000168
0B9344D	1150 °C	0.000897	0.000018	0.034396	0.000106	0.000640	0.000022	0.039274	0.000120	0.260913	0.000509
0B9345D	1175 °C	0.00366	0.000012	0.009856	0.000056	0.000203	0.000012	0.010794	0.000093	0.096334	0.000278
0B9346D	1200 °C	0.000319	0.000012	0.004439	0.000029	0.000133	0.000009	0.004623	0.000028	0.081947	0.000186
0B9347D	1225 °C	0.000504	0.000006	0.001843	0.000038	0.000115	0.000011	0.001772	0.000031	0.127066	0.000271
0B9348D	1250 °C	0.000512	0.000015	0.001287	0.000020	0.000131	0.000006	0.001278	0.000015	0.141134	0.000504
0B9349D	1275 °C	0.000463	0.000011	0.001059	0.000013	0.000106	0.000009	0.000897	0.000023	0.115099	0.000289
0B9350D	1300 °C	0.000482	0.000014	0.000999	0.000027	0.000101	0.000009	0.000925	0.000024	0.124506	0.000441
0B9351D	1325 °C	0.000625	0.000010	0.004219	0.000066	0.000204	0.000012	0.004841	0.000024	0.164219	0.000294
0B9352D	1350 °C	0.000525	0.000009	0.000397	0.000022	0.000111	0.000011	0.000161	0.000020	0.134592	0.000381
0B9353D	1500 °C	0.001181	0.000018	0.001681	0.000024	0.000279	0.000009	0.001754	0.000049	0.323683	0.001159
Incremental Heating	36Ar(a)	37Ar(ca)	38Ar(cl)	39Ar(k)	40Ar(r)	Age ± 2σ (Ka)	40Ar(r) (%)	39Ar(k) (%)	K/Ca ± 2σ		
0B9334D	600 °C	■	0.000066	0.003152	0.000000	0.000991	0.001112	-1524.5 ± 11571.8	6.05	0.33	0.135 ± 0.032
0B9335D	700 °C	■	0.000269	0.012468	0.000013	0.003114	0.002693	1174.3 ± 3282.7	3.28	1.04	0.107 ± 0.009
0B9336D	800 °C	■	0.000444	0.065832	0.000002	0.012538	0.000842	91.2 ± 1315.9	0.64	4.19	0.082 ± 0.004
0B9337D	900 °C	■	0.000262	0.255404	0.000012	0.044231	0.022576	693.2 ± 281.4	22.57	14.78	0.074 ± 0.003
0B9338D	1000 °C	■	0.000306	0.332274	0.000020	0.056229	0.018407	444.7 ± 219.4	16.89	18.79	0.073 ± 0.003
0B9339D	1025 °C	■	0.000088	0.169547	0.000002	0.028156	0.016179	780.5 ± 434.0	38.36	9.41	0.071 ± 0.003
0B9340D	1050 °C	■	0.000074	0.139005	0.000011	0.022601	0.012432	747.1 ± 491.6	36.30	7.55	0.070 ± 0.003
0B9341D	1075 °C	■	0.000110	0.142840	0.000034	0.022642	0.012085	724.9 ± 467.7	27.17	7.57	0.068 ± 0.003
0B9342D	1100 °C	■	0.000668	0.156104	0.000013	0.024176	0.015278	858.3 ± 618.4	7.18	8.08	0.067 ± 0.003
0B9343D	1125 °C	■	0.000353	0.116414	0.000024	0.018811	0.006511	470.1 ± 722.4	5.87	6.29	0.069 ± 0.003
0B9344D	1150 °C	■	0.000653	0.249505	0.000011	0.039054	0.032896	1143.9 ± 471.3	14.55	13.05	0.067 ± 0.003
0B9345D	1175 °C	■	0.000181	0.069519	0.000004	0.010723	0.005285	669.4 ± 1188.4	8.98	3.58	0.066 ± 0.003
0B9346D	1200 °C	■	0.000141	0.029779	0.000010	0.004585	0.001380	408.7 ± 2862.3	3.20	1.53	0.066 ± 0.003
0B9347D	1225 °C	■	0.000320	0.010688	0.000010	0.001747	0.005458	-4249.8 ± 7902.6	6.12	0.58	0.070 ± 0.007
0B9348D	1250 °C	■	0.000326	0.006606	0.000011	0.001256	0.005752	6212.6 ± 14026.5	5.64	0.42	0.082 ± 0.010
0B9349D	1275 °C	■	0.000278	0.005147	0.000013	0.000871	0.007126	-11145.7 ± 26885.1	9.50	0.29	0.073 ± 0.009
0B9350D	1300 °C	■	0.000293	0.004670	0.000021	0.000899	0.002713	-4106.2 ± 27202.7	3.24	0.30	0.083 ± 0.012
0B9351D	1325 °C	■	0.000423	0.023631	0.000009	0.004796	0.002253	-638.2 ± 4858.2	1.84	1.60	0.073 ± 0.004
0B9352D	1350 °C	■	0.000324	0.00166	0.000007	0.000138	0.003932	-39007.2 ± 169394.1	4.28	0.05	0.359 ± 1.189
0B9353D	1500 °C	■	0.001092	0.008622	0.000024	0.001718	0.003774	-2986.3 ± 12360.4	1.18	0.57	0.086 ± 0.008
Σ	0.006671		1.806105	0.000066	0.299276	0.125947					
Information on Analysis	Results			40(r)/39(k) ± 2σ		Age ± 2σ (Ka)	N ₂	39Ar(k) (%,n)	K/Ca ± 2σ		
LO-13-1-1	Weighted Plateau			0.4745 ± 0.0967 ± 20.37%		644.5 ± 131.9 ± 20.47%	0.75	100.00 20	0.071 ± 0.003		
MR						External Error ± 131.9	2.09	Statistical T Ratio			
Laser						Analytical Error ± 131.3	1.0000	Error Magnification			
FJ											
Project = Lunar crater											
Irradiation = 1612h											
J = 0.0007530 ± 0.0000075											
ACs = 1.193 ± 0.001 Ma											
Total Fusion Age				0.4208 ± 0.1814 ± 43.09%		571.6 ± 246.5 ± 43.13%	20	0.071 ± 0.001			
						External Error ± 246.6					
						Analytical Error ± 246.3					

Table DR2. Detailed methodological description and complete dataset generated by the ArArCalc software (Koppers et al., 2002) for each sample of irradiation 2.

Sample LO-13-1-1R_2										
Intercept Values	36Ar	1σ	37Ar	1σ	38Ar	1σ	39Ar	1σ	40Ar	1σ
0B9881D	600 °C	0.000269	0.000013	0.001476	0.000037	0.000099	0.000006	0.004153	0.000063	0.072850
0B9882D	700 °C	0.001658	0.000018	0.006316	0.000040	0.000529	0.000018	0.017097	0.000039	0.473057
0B9883D	800 °C	0.001810	0.000026	0.036063	0.000114	0.001308	0.000019	0.085225	0.000202	0.506675
0B9884D	875 °C	0.001020	0.000022	0.055028	0.000200	0.001742	0.000018	0.128540	0.000262	0.285065
0B9885D	940 °C	0.001054	0.000014	0.062286	0.000155	0.001848	0.000019	0.141756	0.000245	0.269799
0B9886D	1000 °C	0.001048	0.000022	0.070633	0.000207	0.002096	0.000030	0.154150	0.000305	0.272923
0B9887D	1025 °C	0.001003	0.000018	0.059540	0.000148	0.001749	0.000031	0.127791	0.000200	0.264220
0B9888D	1050 °C	0.001159	0.000019	0.056999	0.000150	0.001728	0.000022	0.117714	0.000234	0.327832
0B9889D	1075 °C	0.002342	0.000028	0.059143	0.000217	0.002017	0.000030	0.130703	0.000303	0.715426
0B9890D	1100 °C	0.003034	0.000021	0.089523	0.000206	0.002954	0.000034	0.195624	0.000312	0.914073
0B9891D	1125 °C	0.001442	0.000012	0.059854	0.000137	0.001775	0.000019	0.126933	0.000302	0.432418
0B9892D	1150 °C	0.000474	0.000010	0.016113	0.000067	0.000467	0.000019	0.032576	0.000070	0.139077
0B9893D	1175 °C	0.000726	0.000021	0.019870	0.000114	0.000624	0.000025	0.040909	0.000132	0.225029
0B9894D	1200 °C	0.000479	0.000012	0.008968	0.000071	0.000313	0.000011	0.018116	0.000068	0.141879
0B9895D	1225 °C	0.000543	0.000014	0.004354	0.000073	0.000236	0.000009	0.008595	0.000090	0.141454
0B9896D	1250 °C	0.000558	0.000016	0.002555	0.000031	0.000186	0.000013	0.004755	0.000048	0.158120
0B9897D	1275 °C	0.000664	0.000014	0.002419	0.000038	0.000185	0.000012	0.004501	0.000033	0.190097
0B9898D	1300 °C	0.000713	0.000010	0.001065	0.000032	0.000171	0.000015	0.001568	0.000025	0.189887
Incremental Heating	36Ar(a)	37Ar(ca)	38Ar(cl)	39Ar(k)	40Ar(r)	Age ± 2σ (Ka)		40Ar(r) (%)	39Ar(k) (%)	K/Ca ± 2σ
0B9881D	600 °C	0.000171	0.015555	0.000004	0.004112	2405.3 ± 3403.8		12.58	0.31	0.114 ± 0.011
0B9882D	700 °C	0.001536	0.079969	0.000008	0.017009	284.0 ± 1319.2		0.78	1.28	0.091 ± 0.005
0B9883D	800 °C	0.001575	0.477844	0.000072	0.084844	396.3 ± 331.1		5.05	6.36	0.076 ± 0.004
0B9884D	875 °C	0.000717	0.731987	0.000018	0.127973	597.5 ± 170.7		20.99	9.59	0.075 ± 0.004
0B9885D	940 °C	0.000724	0.829670	0.000080	0.141117	368.0 ± 127.6		15.16	10.58	0.073 ± 0.004
0B9886D	1000 °C	0.000686	0.942042	0.000020	0.153429	453.8 ± 146.3		20.18	11.50	0.070 ± 0.004
0B9887D	1025 °C	0.000683	0.793945	0.000003	0.127178	456.6 ± 155.0		17.48	9.53	0.069 ± 0.004
0B9888D	1050 °C	0.000847	0.760356	0.000076	0.117126	660.1 ± 178.5		18.53	8.78	0.066 ± 0.004
0B9889D	1075 °C	0.002017	0.789641	0.000015	0.130094	1017.0 ± 247.2		14.04	9.75	0.071 ± 0.004
0B9890D	1100 °C	0.002592	1.198241	0.000002	0.194715	869.7 ± 175.1		14.00	14.60	0.070 ± 0.004
0B9891D	1125 °C	0.001074	0.788071	0.000040	0.126310	885.3 ± 215.8		20.59	9.47	0.069 ± 0.004
0B9892D	1150 °C	0.000238	0.212425	0.000016	0.032373	1036.4 ± 730.7		25.97	2.43	0.066 ± 0.004
0B9893D	1175 °C	0.000445	0.263202	0.000007	0.040666	1315.6 ± 686.1		23.46	3.05	0.066 ± 0.004
0B9894D	1200 °C	0.000185	0.116639	0.000006	0.017979	1187.0 ± 1328.5		22.34	1.35	0.066 ± 0.004
0B9895D	1225 °C	0.000219	0.054631	0.000034	0.008501	-1597.6 ± 2931.3		18.31	0.64	0.067 ± 0.005
0B9896D	1250 °C	0.000190	0.030516	0.000028	0.004676	-218.0 ± 5450.6		1.35	0.35	0.066 ± 0.004
0B9897D	1275 °C	0.000245	0.028795	0.000010	0.004420	-248.4 ± 5617.0		1.13	0.33	0.066 ± 0.005
0B9898D	1300 °C	0.000249	0.010637	0.000022	0.001496	-15817.1 ± 15860.5		30.82	0.11	0.060 ± 0.007
Σ	0.014384	8.124167	0.000042	1.334017	0.636433					
Information on Analysis	Results	40(r)/39(k) ± 2σ		Age ± 2σ (Ka)		N _{39Ar}	39Ar(k) (%,n)	K/Ca ± 2σ		
LO-13-1-1 MR Laser FJ	Error Plateau	0.4542 ± 0.0831 ± 19.13%		589.7 ± 113.5 ± 19.25%		3.82	100.00 18	0.070 ± 0.003		
				External Error ± 113.5		2.11	Statistical T Ratio			
				Analytical Error ± 112.8		1.9554	Error Magnification			
Project = Lunar crater Irradiation = 1612h J = 0.0007530 ± 0.0000080 ACs = 1.193 ± 0.001 Ma	Total Fusion Age	0.4771 ± 0.0576 ± 12.08%		648.0 ± 79.5 ± 12.26%		18	0.071 ± 0.001			
				External Error ± 79.5						
				Analytical Error ± 78.3						

Table DR2. Detailed methodological description and complete dataset generated by the ArArCalc software (Koppers et al., 2002) for each sample of irradiation 2.

Sample LO-13-1-1R_3											
Intercept Values	36Ar	1σ	37Ar	1σ	38Ar	1σ	39Ar	1σ	40Ar	1σ	
0B9940D	600 °C	0.000335	0.000009	0.001731	0.000040	0.000121	0.000010	0.004945	0.000051	0.091672	0.000271
0B9941D	700 °C	0.001205	0.000027	0.006293	0.000056	0.000458	0.000015	0.018593	0.000085	0.336050	0.000516
0B9942D	800 °C	0.001471	0.000023	0.035481	0.000118	0.001386	0.000037	0.091414	0.000277	0.423768	0.000443
0B9943D	875 °C	0.001196	0.000019	0.056955	0.000261	0.001940	0.000022	0.142613	0.000188	0.325774	0.000330
0B9944D	940 °C	0.001147	0.000012	0.063260	0.000134	0.002075	0.000044	0.156259	0.000252	0.307052	0.000444
0B9945D	1000 °C	0.001237	0.000021	0.071246	0.000077	0.002285	0.000037	0.169770	0.000356	0.335544	0.000184
0B9946D	1025 °C	0.001043	0.000015	0.059333	0.000225	0.001884	0.000021	0.139188	0.000187	0.295551	0.000372
0B9947D	1050 °C	0.001294	0.000021	0.056639	0.000120	0.001815	0.000034	0.128524	0.000209	0.365649	0.000413
0B9948D	1075 °C	0.009652	0.000045	0.064296	0.000268	0.003668	0.000050	0.150890	0.000328	2.844275	0.001510
0B9949D	1100 °C	0.003621	0.000031	0.112359	0.000241	0.003864	0.000040	0.264200	0.000297	1.117957	0.000662
0B9950D	1125 °C	0.001694	0.000017	0.059902	0.000185	0.001927	0.000040	0.131313	0.000289	0.511462	0.000341
0B9951D	1150 °C	0.000990	0.000009	0.028795	0.000090	0.000964	0.000032	0.064918	0.000220	0.296201	0.000179
0B9952D	1175 °C	0.000663	0.000016	0.016064	0.000137	0.000581	0.000022	0.035738	0.000123	0.191103	0.000216
0B9953D	1200 °C	0.000959	0.000021	0.009924	0.000100	0.000434	0.000010	0.021466	0.000088	0.274494	0.000470
0B9954D	1225 °C	0.000750	0.000015	0.005071	0.000039	0.000307	0.000011	0.010816	0.000035	0.218608	0.000118
0B9955D	1250 °C	0.000776	0.000015	0.002593	0.000041	0.000184	0.000014	0.005314	0.000043	0.221279	0.000410
0B9956D	1275 °C	0.000907	0.000007	0.000883	0.000027	0.000175	0.000013	0.001339	0.000029	0.249739	0.000295
0B9957D	1300 °C	0.001022	0.000019	0.000799	0.000022	0.000222	0.000014	0.000932	0.000025	0.289956	0.000357
Incremental Heating											
	36Ar(a)	37Ar(ca)	38Ar(cl)	39Ar(k)	40Ar(r)	Age ± 2σ (Ka)		40Ar(r) (%)	39Ar(k) (%)	K/Ca ± 2σ	
0B9940D	600 °C	0.000244	0.020251	0.000000	0.004910	0.006215	1718.7 ± 1949.7	7.94	0.32	0.104 ± 0.010	
0B9941D	700 °C	0.001084	0.086215	0.000000	0.018510	0.001290	94.7 ± 1335.5	0.40	1.21	0.092 ± 0.006	
0B9942D	800 °C	0.001224	0.508514	0.000000	0.091022	0.045540	679.5 ± 252.5	11.18	5.95	0.077 ± 0.004	
0B9943D	875 °C	0.000861	0.819700	0.000000	0.141994	0.053468	511.5 ± 141.3	17.36	9.27	0.074 ± 0.004	
0B9944D	940 °C	0.000785	0.911570	0.000000	0.155573	0.055967	488.6 ± 103.8	19.44	10.16	0.073 ± 0.004	
0B9945D	1000 °C	0.000839	0.1027929	0.000000	0.169000	0.066599	535.3 ± 127.5	21.17	11.04	0.071 ± 0.004	
0B9946D	1025 °C	0.000691	0.855793	0.000000	0.138543	0.069007	676.5 ± 122.2	25.24	9.05	0.070 ± 0.004	
0B9947D	1050 °C	0.000949	0.817262	0.000005	0.127907	0.061435	652.4 ± 168.2	17.96	8.35	0.067 ± 0.004	
0B9948D	1075 °C	0.009240	0.929005	0.000027	0.150192	0.088445	799.8 ± 638.0	3.14	9.81	0.070 ± 0.004	
0B9949D	1100 °C	0.003019	1.628532	0.000000	0.262398	0.195211	1008.1 ± 169.5	17.95	17.18	0.069 ± 0.004	
0B9950D	1125 °C	0.001305	0.808712	0.000029	0.130701	0.087378	908.0 ± 192.3	18.48	8.54	0.069 ± 0.004	
0B9951D	1150 °C	0.000680	0.414919	0.000007	0.064593	0.046116	969.6 ± 282.7	18.67	4.22	0.067 ± 0.004	
0B9952D	1175 °C	0.000361	0.229889	0.000039	0.035549	0.021367	816.3 ± 557.9	16.69	2.32	0.066 ± 0.004	
0B9953D	1200 °C	0.000216	0.140699	0.000000	0.021315	0.008713	555.2 ± 3135.2	11.99	1.39	0.065 ± 0.004	
0B9954D	1225 °C	0.000254	0.069763	0.000028	0.010726	0.008034	1017.2 ± 8644.1	9.66	0.70	0.066 ± 0.004	
0B9955D	1250 °C	0.000223	0.036322	0.000000	0.005250	0.000000	0.0 ± 0.0	0.0	0.34	0.067 ± 0.005	
0B9956D	1275 °C	0.000295	0.008628	0.000000	0.001294	0.000000	0.0 ± 0.0	0.0	0.08	0.064 ± 0.009	
0B9957D	1300 °C	0.000346	0.007332	0.000001	0.000888	0.000000	0.0 ± 0.0	0.0	0.06	0.052 ± 0.009	
Σ	0.022616	9.318334	0.000136	1.530955	0.814785						
Information on Analysis		Results	40(r)/39(k) ± 2σ		Age ± 2σ (Ka)		N _S	39Ar(k) (%,n)	K/Ca ± 2σ		
LO-13-1-1	MR	Weighted Plateau	0.4191	± 0.0470 ± 11.21%	569.2	± 64.9 ± 11.41%	1.33	65.17 9	0.074 ± 0.005		
Laser					External Error	± 65.0	2.31	Statistical T Ratio			
FJ					Analytical Error	± 63.8	1.1512	Error Magnification			
Project = Lunar crater	Total Fusion Age		0.5322	± 0.0815 ± 15.31%	722.8	± 111.7 ± 15.45%	18	0.071 ± 0.001			
Irradiation = 1612h					External Error	± 111.7					
J = 0.0007530 ± 0.0000080					Analytical Error	± 110.7					
ACs = 1.193 ± 0.001 Ma											

Table DR2. Detailed methodological description and complete dataset generated by the ArArCalc software (Koppers et al., 2002) for each sample of irradiation 2.

Sample LO-10-5R											
Intercept Values	36Ar	1σ	37Ar	1σ	38Ar	1σ	39Ar	1σ	40Ar	1σ	
0B9820D	600 °C	0.002459	0.000018	0.000728	0.000015	0.000499	0.000021	0.001434	0.000046	0.698256	0.000695
0B9821D	700 °C	0.003347	0.000020	0.001948	0.000041	0.000718	0.000022	0.004655	0.000039	0.997769	0.001041
0B9822D	800 °C	0.003989	0.000028	0.014796	0.000112	0.001036	0.000009	0.026306	0.000109	1.137012	0.001640
0B9823D	875 °C	0.003853	0.000021	0.042375	0.000173	0.001546	0.000019	0.067867	0.000288	1.085370	0.000893
0B9824D	940 °C	0.007229	0.000056	0.040030	0.000121	0.002108	0.000029	0.062822	0.000173	2.124328	0.002220
0B9825D	1000 °C	0.038354	0.000129	0.040147	0.000181	0.007981	0.000041	0.062106	0.000118	11.302683	0.005590
0B9826D	1025 °C	0.002596	0.000026	0.023077	0.000107	0.000963	0.000023	0.034923	0.000161	0.752531	0.000486
0B9827D	1050 °C	0.002125	0.000020	0.022631	0.000100	0.000832	0.000024	0.033437	0.000156	0.627998	0.000627
0B9828D	1075 °C	0.008425	0.000054	0.035581	0.000144	0.002216	0.000022	0.049963	0.000184	2.479271	0.001198
0A9830D	1100 °C	0.038127	0.000137	0.028180	0.000105	0.007643	0.000076	0.041770	0.000095	11.100685	0.002026
0B9832D	1150 °C	0.031829	0.000114	0.148845	0.000042	0.008594	0.000069	0.214757	0.000097	9.485392	0.014736
0B9833D	1175 °C	0.011263	0.000080	0.060377	0.000341	0.003166	0.000047	0.083792	0.000370	3.328819	0.006472
0B9834D	1200 °C	0.001874	0.000022	0.010384	0.000072	0.000540	0.000017	0.013414	0.000092	0.563364	0.000701
0B9835D	1225 °C	0.001158	0.000011	0.004812	0.000058	0.000265	0.000015	0.059573	0.000042	0.326472	0.000256
0B9836D	1250 °C	0.001099	0.000029	0.003455	0.000062	0.000248	0.000012	0.004245	0.000035	0.316525	0.000285
0B9837D	1275 °C	0.000961	0.000024	0.002049	0.000027	0.000198	0.000013	0.002450	0.000036	0.277544	0.000312
0B9838D	1300 °C	0.001110	0.000023	0.001586	0.000048	0.000245	0.000013	0.001833	0.000029	0.315241	0.000646
Incremental Heating	36Ar(a)	37Ar(ca)	38Ar(cl)	39Ar(k)	40Ar(r)	Age ± 2σ (Ka)	40Ar(r) (%)	39Ar(k) (%)	K/Ca ± 2σ		
0B9820D	600 °C	■	0.002361	0.005394	0.000018	0.001420	0.014677	-14138.2 ± 22123.8	2.15	0.18	0.113 ± 0.019
0B9821D	700 °C	■	0.003245	0.020743	0.000032	0.004631	0.023812	6990.3 ± 8651.2	2.42	0.60	0.096 ± 0.008
0B9822D	800 °C	■	0.003834	0.182422	0.000032	0.026153	0.011296	-588.4 ± 1876.1	1.01	3.40	0.062 ± 0.004
0B9823D	875 °C	■	0.003564	0.529461	0.000003	0.067435	0.008295	167.5 ± 1046.2	0.78	8.77	0.055 ± 0.003
0B9824D	940 °C	■	0.006950	0.500573	0.000002	0.062407	0.053780	1173.4 ± 1446.1	2.55	8.12	0.054 ± 0.003
0B9825D	1000 °C	■	0.037915	0.502348	0.000078	0.061684	0.080803	1783.4 ± 6934.1	0.72	8.02	0.053 ± 0.003
0B9826D	1025 °C	■	0.002395	0.287326	0.000056	0.034667	0.026476	1040.0 ± 1019.7	3.61	4.51	0.052 ± 0.003
0B9827D	1050 °C	■	0.001929	0.281876	0.000032	0.033187	0.038827	1592.9 ± 864.8	6.38	4.32	0.051 ± 0.003
0B9828D	1075 °C	■	0.008155	0.445610	0.000041	0.049592	0.049398	1356.3 ± 2025.9	2.01	6.45	0.048 ± 0.003
0A9830D	1100 °C	■	0.094487	0.886810	0.000067	0.103711	0.191161	-2512.3 ± 10323.7	0.69	13.49	0.050 ± 0.003
0B9832D	1150 °C	■	0.031010	1.880490	0.000061	0.213279	0.293781	1875.2 ± 1680.5	3.11	27.74	0.049 ± 0.003
0B9833D	1175 °C	■	0.010832	0.760623	0.000057	0.083174	0.090572	1482.6 ± 1731.6	2.75	10.82	0.047 ± 0.003
0B9834D	1200 °C	■	0.001649	0.127422	0.000030	0.013275	0.033160	3399.1 ± 3735.3	6.37	1.73	0.045 ± 0.003
0B9835D	1225 °C	■	0.000942	0.056830	0.000022	0.005883	0.001029	238.2 ± 758.1	0.37	0.77	0.045 ± 0.003
0B9836D	1250 °C	■	0.000877	0.039640	0.000008	0.004163	0.007312	2390.6 ± 11804.6	2.74	0.54	0.045 ± 0.003
0B9837D	1275 °C	■	0.000737	0.021806	0.000012	0.002377	0.008026	4593.8 ± 19870.1	3.55	0.31	0.047 ± 0.004
0B9838D	1300 °C	■	0.000884	0.015945	0.000012	0.001761	0.001857	1435.6 ± 26946.7	0.71	0.23	0.047 ± 0.005
Σ	2.11768	6.545318	0.000406	0.768798	0.499994						
Information on Analysis	Results	40(r)/39(k) ± 2σ			Age ± 2σ (Ka)	M	39Ar(k) (%,n)	K/Ca ± 2σ			
LO-10-5 MR Laser FJ	Weighted Plateau	0.8024 ± 0.3268 ± 40.74%			1092.6 ± 446.1 ± 40.83%	0.93	100.00 17	0.050 ± 0.003			
					External Error ± 446.1	2.12	Statistical T Ratio				
					Analytical Error ± 444.9	1.0000	Error Magnification				
Project = Lunar crater Irradiation = 1612h J = 0.0007550 ± 0.0000110 ACs = 1.193 ± 0.001 Ma	Total Fusion Age	0.6504 ± 1.1764 ± 180.89%			885.6 ± 1601.8 ± 180.87%		17	0.051 ± 0.001			
					External Error ± 1601.8						
					Analytical Error ± 1601.6						

Table DR2. Detailed methodological description and complete dataset generated by the ArArCalc software (Koppers et al., 2002) for each sample of irradiation 2.

Sample LO-13-1-1-3R										
Intercept Values	36Ar	1σ	37Ar	1σ	38Ar	1σ	39Ar	1σ	40Ar	1σ
0B9839D	600 °C	0.000279	0.000009	0.001980	0.000028	0.000116	0.000008	0.003789	0.000059	0.065462
0B9840D	700 °C	0.001141	0.000014	0.009112	0.000061	0.000451	0.000013	0.019523	0.000110	0.324699
0B9841D	800 °C	0.001641	0.000020	0.032806	0.000201	0.001100	0.000019	0.067565	0.000268	0.470289
0B9842D	875 °C	0.001343	0.000024	0.051176	0.000175	0.001471	0.000026	0.105957	0.000389	0.363235
0B9843D	940 °C	0.001395	0.000022	0.062111	0.000219	0.001627	0.000039	0.121529	0.000154	0.374589
0B9844D	1000 °C	0.001359	0.000015	0.081192	0.000161	0.002040	0.000040	0.144218	0.000224	0.348248
0B9845D	1025 °C	0.001000	0.000018	0.045273	0.000220	0.001069	0.000029	0.075208	0.000096	0.268017
0B9846D	1050 °C	0.000805	0.000013	0.044749	0.000167	0.000994	0.000022	0.066775	0.000146	0.211025
0B9847D	1075 °C	0.001412	0.000017	0.096975	0.000105	0.002045	0.000025	0.134550	0.000114	0.348061
0B9848D	1100 °C	0.005705	0.000058	0.099539	0.000181	0.002797	0.000037	0.131507	0.000265	1.603680
0B9849D	1125 °C	0.002386	0.000017	0.051690	0.000315	0.001503	0.000037	0.078598	0.000370	0.674256
0B9850D	1150 °C	0.002973	0.000037	0.091878	0.000139	0.002275	0.000026	0.144560	0.000323	0.837711
0B9851D	1175 °C	0.001357	0.000020	0.052625	0.000242	0.001254	0.000016	0.080432	0.000362	0.387483
0B9852D	1200 °C	0.000958	0.000011	0.029271	0.000117	0.000746	0.000018	0.043815	0.000098	0.265251
0B9853D	1225 °C	0.000628	0.000016	0.015718	0.000068	0.000410	0.000009	0.023380	0.000144	0.173359
0B9854D	1250 °C	0.000630	0.000017	0.011099	0.000100	0.000323	0.000020	0.016519	0.000071	0.172823
0B9855D	1275 °C	0.000483	0.000010	0.002277	0.000036	0.000134	0.000013	0.002901	0.000058	0.132624
0B9856D	1300 °C	0.000596	0.000008	0.001188	0.000040	0.000139	0.000008	0.001333	0.000028	0.160145
Incremental Heating										
Results	36Ar(a)	37Ar(ca)	38Ar(cl)	39Ar(k)	40Ar(r)	Age ± 2σ (Ka)	40Ar(r) (%)	39Ar(k) (%)	K/Ca ± 2σ	
0B9839D	600 °C	0.000188	0.021393	0.000013	0.003765	0.005178	-1869.5 ± 3317.2	10.29	0.30	0.076 ± 0.006
0B9840D	700 °C	0.001024	0.113127	0.000002	0.019422	0.007174	501.7 ± 978.1	2.32	1.55	0.074 ± 0.004
0B9841D	800 °C	0.001430	0.417832	0.000026	0.067222	0.032217	650.9 ± 381.3	7.08	5.36	0.069 ± 0.004
0B9842D	875 °C	0.001058	0.654227	0.000073	0.105425	0.034510	444.6 ± 243.0	9.94	8.41	0.069 ± 0.004
0B9843D	940 °C	0.001062	0.795139	0.000121	0.120886	0.043886	493.1 ± 207.1	12.26	9.64	0.065 ± 0.004
0B9844D	1000 °C	0.000951	1.041172	0.000022	0.143386	0.049243	466.5 ± 150.4	14.90	11.44	0.059 ± 0.003
0B9845D	1025 °C	0.000725	0.579072	0.000042	0.074735	0.035415	643.6 ± 268.8	14.19	5.96	0.055 ± 0.003
0B9846D	1050 °C	0.000533	0.572702	0.000025	0.066308	0.034192	700.4 ± 248.7	17.82	5.29	0.050 ± 0.003
0B9847D	1075 °C	0.000938	1.246841	0.000154	0.133565	0.048398	492.2 ± 200.3	14.86	10.65	0.046 ± 0.003
0B9848D	1100 °C	0.005194	1.280642	0.000146	0.130496	0.044456	462.7 ± 600.9	2.81	10.41	0.044 ± 0.002
0B9849D	1125 °C	0.002058	0.663402	0.000105	0.078052	0.039382	685.3 ± 415.7	6.08	6.22	0.051 ± 0.003
0B9850D	1150 °C	0.002488	1.183115	0.000031	0.143610	0.073409	694.3 ± 321.9	9.08	11.45	0.052 ± 0.003
0B9851D	1175 °C	0.001059	0.676422	0.000022	0.079875	0.056813	949.0 ± 801.7	15.13	6.37	0.051 ± 0.003
0B9852D	1200 °C	0.000747	0.374654	0.000032	0.043489	0.025608	797.7 ± 1420.1	10.40	3.47	0.050 ± 0.003
0B9853D	1225 °C	0.000464	0.199384	0.000004	0.023186	0.016173	947.4 ± 2671.0	10.55	1.85	0.050 ± 0.003
0B9854D	1250 °C	0.000476	0.139654	0.000000	0.016368	0.010038	832.9 ± 3799.8	6.67	1.31	0.050 ± 0.003
0B9855D	1275 °C	0.000348	0.025350	0.000002	0.002835	0.003935	1884.6 ± 21493.9	3.68	0.23	0.048 ± 0.004
0B9856D	1300 °C	0.000447	0.011212	0.000005	0.001274	0.002684	-2863.1 ± 47889.3	2.07	0.10	0.049 ± 0.006
Σ	0.021190	9.995341	0.000239	1.253901	0.545987					
Information on Analysis										
Results	40(r)/39(k) ± 2σ			Age ± 2σ (Ka)		N _{39Ar}	39Ar(k) (%n)		K/Ca ± 2σ	
Weighted Plateau	0.3990 ± 0.0568 $\pm 14.25\%$			542.0 ± 77.7 $\pm 14.33\%$		0.56	100.00 18		0.053 ± 0.004	
				External Error ± 77.7		2.11	Statistical T Ratio			
				Analytical Error ± 77.2		1.0000	Error Magnification			
Project = Lunar crater										
Irradiation = 1612h										
J = 0.0007530 ± 0.0000060										
ACs = 1.193 ± 0.001 Ma										

Table DR2. Detailed methodological description and complete dataset generated by the ArArCalc software (Koppers et al., 2002) for each sample of irradiation 2.

Sample LHN-05-65R_1											
Intercept Values	36Ar	1σ	37Ar	1σ	38Ar	1σ	39Ar	1σ	40Ar	1σ	
0B9264D	550 °C	0.000672	0.000010	0.000778	0.000029	0.000138	0.000009	0.000952	0.000015	0.175076	0.000195
0B9265D	600 °C	0.000604	0.000008	0.000998	0.000018	0.000141	0.000008	0.001312	0.000016	0.165462	0.000233
0B9266D	650 °C	0.007956	0.000044	0.001455	0.000026	0.001459	0.000022	0.002103	0.000027	2.227827	0.002358
0B9267D	700 °C	0.002485	0.000023	0.001939	0.000027	0.000478	0.000012	0.003114	0.000028	0.733462	0.000637
0B9268D	775 °C	0.000702	0.000008	0.005199	0.000049	0.000241	0.000009	0.008306	0.000025	0.189632	0.000496
0B9269D	850 °C	0.001955	0.000017	0.012456	0.000088	0.000612	0.000011	0.018236	0.000025	0.547524	0.000479
0B9270D	925 °C	0.001214	0.000019	0.019076	0.000114	0.000585	0.000014	0.027297	0.000103	0.365308	0.000457
0B9271D	1000 °C	0.003635	0.000033	0.019897	0.000127	0.000973	0.000025	0.026194	0.000091	1.063764	0.001296
0B9272D	1075 °C	0.004224	0.000020	0.029925	0.000129	0.001262	0.000020	0.037376	0.000096	1.272584	0.001272
0B9273D	1150 °C	0.030787	0.000080	0.234488	0.000396	0.008779	0.000036	0.245396	0.000186	9.061561	0.007272
0B9274D	1225 °C	0.001925	0.000021	0.044042	0.000122	0.000932	0.000017	0.044207	0.000106	0.549400	0.000466
0B9275D	1300 °C	0.001228	0.000014	0.011548	0.000082	0.000409	0.000017	0.012039	0.000080	0.334900	0.001243
0B9276D	1375 °C	0.001586	0.000019	0.007662	0.000047	0.000422	0.000018	0.008620	0.000094	0.432734	0.002281
0B9277D	1450 °C	0.001206	0.000017	0.001184	0.000027	0.000285	0.000019	0.001497	0.000046	0.321802	0.000707
0B9278D	1500 °C	0.002320	0.000029	0.000340	0.000015	0.000474	0.000010	0.000399	0.000014	0.656730	0.001293
Incremental Heating	36Ar(a)	37Ar(ca)	38Ar(cl)	39Ar(k)	40Ar(r)	Age ± 2σ (Ma)		40Ar(r) (%)	39Ar(k) (%)	K/Ca ± 2σ	
0B9264D	550 °C	0.000513	0.002771	0.000009	0.000936	0.004094		-5.89 ± 13.81	2.78	0.22	0.145 ± 0.037
0B9265D	600 °C	0.000448	0.004311	0.000003	0.001294	0.004811		4.99 ± 8.83	3.51	0.30	0.129 ± 0.020
0B9266D	650 °C	0.007762	0.007506	0.000060	0.002082	0.054321		-61.93 ± 45.23	4.29	0.48	0.119 ± 0.012
0B9267D	700 °C	0.002322	0.010891	0.000034	0.003091	0.018956		8.22 ± 10.32	2.69	0.72	0.122 ± 0.010
0B9268D	775 °C	0.000545	0.033716	0.000003	0.008263	0.000479		0.08 ± 1.47	0.30	1.92	0.105 ± 0.005
0B9269D	850 °C	0.001778	0.084563	0.000012	0.018149	0.006167		-0.46 ± 1.39	1.19	4.21	0.092 ± 0.004
0B9270D	925 °C	0.001027	0.131021	0.000013	0.027170	0.032752		1.62 ± 0.76	9.74	6.31	0.089 ± 0.004
0B9271D	1000 °C	0.003431	0.136866	0.000036	0.026064	0.019381		1.00 ± 1.77	1.88	6.05	0.082 ± 0.004
0B9272D	1075 °C	0.003991	0.207335	0.000053	0.033549	0.060078		2.41 ± 1.41	4.85	7.79	0.070 ± 0.003
0B9273D	1150 °C	0.002998	0.164427	0.000047	0.244022	0.160774		0.89 ± 1.37	1.78	56.63	0.064 ± 0.003
0B9274D	1225 °C	0.001656	0.306833	0.000029	0.043941	0.019847		0.61 ± 0.60	3.90	10.20	0.062 ± 0.003
0B9275D	1300 °C	0.001004	0.078605	0.000019	0.011952	0.007913		-0.89 ± 1.64	2.74	2.77	0.065 ± 0.003
0B9276D	1375 °C	0.001352	0.051204	0.000009	0.008554	0.014482		-2.28 ± 2.86	3.76	1.99	0.072 ± 0.004
0B9277D	1450 °C	0.000971	0.005518	0.000033	0.001469	0.014779		-13.57 ± 14.22	5.43	0.34	0.114 ± 0.015
0B9278D	1500 °C	0.002058	0.000492	0.000032	0.000377	0.008807		-31.69 ± 91.45	1.47	0.09	0.329 ± 0.337
Σ	0.058857	2.704876	0.000108	0.430913	0.166515						
Information on Analysis	Results	40(r)/39(k) ± 2σ			Age ± 2σ (Ma)		M ₉	39Ar(k) (%,n)	K/Ca ± 2σ		
LHN05-65	Weighted Plateau	0.8222 ± 0.4379			1.105 ± 0.533		2.04	86.97	0.070 ± 0.010		
MR		± 53.26%			External Error ± 0.59		2.78	Statistical T Ratio			
Laser					Analytical Error ± 0.59		1.4271	Error Magnification			
FJ											
Project = Lunar crater	Total Fusion Age	0.3864 ± 0.6234			0.52 ± 0.84		15	0.069 ± 0.002			
Irradiation = 1612h		± 161.32%									
J = 0.0007450 ± 0.0000040					External Error ± 0.84						
ACs = 1.193 ± 0.001 Ma					Analytical Error ± 0.84						

Table DR2. Detailed methodological description and complete dataset generated by the ArArCalc software (Koppers et al., 2002) for each sample of irradiation 2.

Sample LHN-05-65R_2											
Intercept Values	36Ar	1σ	37Ar	1σ	38Ar	1σ	39Ar	1σ	40Ar	1σ	
0B9899D	600 °C	0.000702	0.000014	0.001590	0.000034	0.000198	0.000019	0.005106	0.000038	0.199943	0.000292
0B9900D	700 °C	0.002848	0.000020	0.005454	0.000033	0.000768	0.000020	0.018907	0.000094	0.835544	0.000882
0B9901D	800 °C	0.007263	0.000042	0.022546	0.000106	0.002187	0.000037	0.071645	0.000229	2.112470	0.001818
0B9902D	875 °C	0.005941	0.000045	0.034529	0.000103	0.002346	0.000018	0.105690	0.000185	1.727838	0.001470
0B9903D	940 °C	0.019175	0.000056	0.021247	0.000125	0.004320	0.000024	0.057254	0.000114	5.705814	0.002686
0B9904D	970 °C	0.007475	0.000019	0.015092	0.000055	0.000617	0.000024	0.036513	0.000166	0.208355	0.000428
0B9905D	1000 °C	0.006269	0.000013	0.016595	0.000153	0.000608	0.000019	0.036042	0.000087	0.174618	0.000264
0B9906D	1025 °C	0.005426	0.000030	0.038911	0.000146	0.001982	0.000032	0.077086	0.000208	1.570348	0.001068
0B9907D	1050 °C	0.009123	0.000048	0.075758	0.000206	0.003432	0.000019	0.128846	0.000315	2.658801	0.001206
0B9908D	1075 °C	0.006634	0.000036	0.031232	0.000135	0.001985	0.000022	0.057217	0.000151	1.949130	0.001672
0B9909D	1100 °C	0.006790	0.000051	0.094973	0.000221	0.003665	0.000049	0.196841	0.000362	2.003212	0.001275
0B9910D	1125 °C	0.002618	0.000034	0.049959	0.000159	0.001720	0.000013	0.099142	0.000343	0.776154	0.001102
0B9911D	1150 °C	0.001076	0.000016	0.021240	0.000122	0.000734	0.000019	0.040798	0.000132	0.314018	0.000492
0B9912D	1175 °C	0.001427	0.000024	0.021902	0.000157	0.000771	0.000021	0.042568	0.000128	0.423136	0.000477
0B9913D	1200 °C	0.000763	0.000012	0.010780	0.000068	0.000394	0.000015	0.020405	0.000077	0.226013	0.000293
0B9914D	1225 °C	0.000622	0.000012	0.004705	0.000058	0.000215	0.000011	0.008645	0.000039	0.170675	0.000366
0B9915D	1250 °C	0.000626	0.000011	0.002750	0.000053	0.000180	0.000011	0.004810	0.000054	0.175277	0.000216
0B9916D	1275 °C	0.000691	0.000019	0.001724	0.000019	0.000162	0.000014	0.002798	0.000042	0.186347	0.000274
0B9917D	1300 °C	0.000721	0.000015	0.001091	0.000034	0.000187	0.000017	0.001704	0.000028	0.199508	0.000323
Incremental Heating	36Ar(a)	37Ar(ca)	38Ar(cl)	39Ar(k)	40Ar(r)	Age ± 2σ (Ka)		40Ar(r) (%)	39Ar(k) (%)	K/Ca ± 2σ	
0B9899D	600 °C	0.000595	0.017471	0.000008	0.005058	0.009113	2429.6 ± 3345.5		4.93	0.46	0.124 ± 0.010
0B9900D	700 °C	0.002724	0.070064	0.000007	0.018284	0.015055	1079.0 ± 1692.7		1.84	1.72	0.116 ± 0.007
0B9901D	800 °C	0.007062	0.304067	0.000051	0.071397	0.009128	172.5 ± 1051.4		0.44	6.54	0.101 ± 0.006
0B9902D	875 °C	0.005698	0.468438	0.000066	0.105322	0.027002	345.9 ± 622.3		1.58	9.64	0.097 ± 0.005
0B9903D	940 °C	0.047458	0.723595	0.000096	0.142579	0.222955	2108.9 ± 3180.0		1.56	13.06	0.085 ± 0.005
0B9904D	970 °C	0.000589	0.202639	0.000021	0.036338	0.015974	593.1 ± 547.7		8.40	3.33	0.077 ± 0.004
0B9905D	1000 °C	0.000465	0.223404	0.000042	0.035850	0.018293	688.5 ± 452.0		11.74	3.28	0.069 ± 0.004
0B9906D	1025 °C	0.005156	0.530040	0.000025	0.076667	0.027021	475.6 ± 727.1		1.74	7.02	0.062 ± 0.004
0B9907D	1050 °C	0.008695	0.1036768	0.000166	0.128053	0.068627	723.1 ± 719.8		2.60	11.73	0.053 ± 0.003
0B9908D	1075 °C	0.006396	0.425037	0.000051	0.056868	0.042064	997.9 ± 1235.2		2.18	5.21	0.058 ± 0.003
0B9909D	1100 °C	0.006284	1.302465	0.000003	0.195846	0.122573	844.4 ± 393.3		6.19	17.93	0.065 ± 0.004
0B9910D	1125 °C	0.002276	0.683506	0.000027	0.098596	0.071022	971.8 ± 426.9		9.55	9.03	0.062 ± 0.004
0B9911D	1150 °C	0.000816	0.288268	0.000039	0.040539	0.028967	964.0 ± 656.8		10.73	3.71	0.060 ± 0.003
0B9912D	1175 °C	0.001123	0.297679	0.000009	0.042300	0.034126	1088.3 ± 737.5		9.32	3.87	0.061 ± 0.004
0B9913D	1200 °C	0.000461	0.144510	0.000008	0.020247	0.018366	1223.6 ± 1204.2		11.89	1.85	0.060 ± 0.003
0B9914D	1225 °C	0.000296	0.060817	0.000002	0.008546	0.003634	-573.9 ± 2800.9		4.34	0.78	0.060 ± 0.004
0B9915D	1250 °C	0.000257	0.033955	0.000009	0.004728	0.003316	-946.6 ± 4972.3		4.56	0.43	0.060 ± 0.005
0B9916D	1275 °C	0.000276	0.019898	0.000003	0.002723	0.013489	-6697.7 ± 9756.5		19.84	0.25	0.059 ± 0.004
0B9917D	1300 °C	0.000257	0.011248	0.000036	0.001631	0.009998	-8291.3 ± 15379.4		15.17	0.15	0.062 ± 0.007
Σ		0.096885	6.843869	0.000412	1.092112	0.699849					
Information on Analysis	Results	40(r)/39(k) ± 2σ			Age ± 2σ (Ka)		M _{SD}	39Ar(k) (%,n)	K/Ca ± 2σ		
LHN05-65	Weighted Plateau	0.5672 ± 0.1277			765.3 ± 174.0		0.79	100.0	0.066 ± 0.007		
MR		± 22.51%			± 22.73%			19			
Laser					External Error ± 174.0		2.10	Statistical T Ratio			
FJ					Analytical Error ± 172.2		1.0000	Error Magnification			
Project = Lunar crater											
Irradiation = 162h											
J = 0.0007480 ± 0.0000120											
ACs = 1.193 ± 0.001 Ma											