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$^{40}Ar/^{39}Ar$ Age-Spectrum Data for Hornblende, Biotite, White Mica, and K-Feldspar Samples From Metamorphic Rocks in the Great Smoky Mountains of North Carolina and Tennessee

Open-File Report 2011–1250

U.S. Department of the Interior
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KEN SALAZAR, Secretary

U.S. Geological Survey
Marcia K. McNutt, Director

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Introduction

This report contains reduced $^{40}Ar/^{39}Ar$ data of hornblende, biotite, white mica and (or) sericite, and potassium-feldspar mineral separates and phyllite groundmass samples from metamorphic rocks of the Great Smoky Mountains in North Carolina and Tennessee. Included in this report are information on the location of the samples and a brief description of the samples. The data contained herein are not interpreted in a geological context, and care should be taken by users unfamiliar with argon isotopic data in the use of these results. No geological meaning is implied for any of the apparent ages presented below, and many of the individual apparent ages are not geologically meaningful. This report is primarily a detailed source document for subsequent publications that will integrate these data into a geological context. All the samples in this report were collected in and around the Great Smoky Mountain National Park in western North Carolina and eastern Tennessee. Table 1 is a listing of the location of all the samples and includes the sample number, the U.S. Geological Survey (USGS) 7.5-minute quadrangle that the sample is located in, the material dated, and the latitude and longitude of the sample site. In general, the samples are listed by mineral and (or) sample type and date of collection.

Methods

Sample Preparation

Samples were crushed, ground, and sized using 250-, 180-, and 150-micrometer (μm) sieves. Mineral separates were produced using magnetic separation, heavy liquid separation, paper shaking, and hand picking to a purity of more than 99 percent for biotite, white mica, and K-feldspar. Hornblendes were prepared to a purity of 99.9 percent using the same methods. The purity of sericite samples is variable but generally greater than 99 percent. Most samples were washed in acetone, alcohol, and deionized water (X3) in a Branson B220 ultrasonic cleaner to remove dust and then resieved by hand using a 100-μm sieve. Very fine-grained white mica (sericite) and phyllite groundmass samples were washed in the same series of solvents but without the use of the ultrasonic cleaner.

The samples were irradiated in duplicate in two separate packages (KD 32 and KD 43). Approximately 5 milligrams (mg) of biotite, 10 mg of white mica and (or) sericite and K-feldspar, 50 mg of groundmass samples, and 100 mg of hornblende were packaged in copper capsules and sealed under vacuum in fused silica tubes. Duplicate samples of biotite, white mica and (or) seracite and K-spar were loaded at about one-tenth the weights mentioned above. The samples were then irradiated in the central thimble facility at the TRIGA reactor (GSTR) at the USGS, Denver, Colorado. The monitor mineral used in both packages was MMhb-1 hornblende with an age of 519.4 ±2.5 million years (Alexander and others, 1978; Dalrymple and others, 1981). The type of container and the geometry of samples and standards are similar to those described by Snee and others (1988).

Sample Analysis

All hornblende and groundmass samples and some of the other minerals samples were analyzed at the USGS, Denver on a VG Isotopes, Ltd. Model 1200 B mass spectrometer fitted with an electron multiplier using the $^{40}Ar/^{39}Ar$ step heating method of dating. Heating for 10 minutes per step followed a schedule of 5 to 15 steps. The heating schedules were designed such that the percentage of ^{39}Ar released per step was limited to less than 20 percent of the total released for most samples.

The samples were heated in a small volume, molybdenum-lined, low-blank tantalum resistance furnace similar to that described by Staudacher (1978). Temperature was monitored by a W5Re-W26Re thermocouple and controlled by a proportional, programmable controller. The furnace and the rear manifold were pumped between steps with a turbo molecular pump. Two isolated ion pumps

Table 1. Material dated, location of sample, and formation.

[Fm, formation]

Field no.	Unit	Rock type	Mineral dated	Latitude	Longitude	Quadrangle name	Packet	Package
			Amphibole					
K02–9–19H	Mesoproterozic rocks	Biotite gneiss	Amphibole	N35° 26’ 52.4	W83° 24’ 03.7	Bryson City, N.C.	97	32
K02–9–19I	Mesoproterozic rocks	Biotite amphibole gneiss	Amphibole	N35° 27’ 06.8	W83° 22’ 38.4	Bryson City, N.C.	101	32
K04–7–13J	Mesoproterozic rocks	Amphibolite	Amphibole	N35° 32.287’	W83° 01.501’	Dellwood, N.C.	217	43
K04–7–14C	Mesoproterozic rocks	Amphibolite	Amphibole	N35° 34.872’	W82° 59.241’	Clyde, N.C.	306	43
			White mica/sericite					
K02–9–18A	Wilhite Fm	Micaceous metasiltstone	White mica	N35° 41’ 20.2”	W83° 47’ 53.4”	Kinzel Springs, Tenn.	198	32
K02–9–18B	Metcalf Phyllite	Phyllite	White mica	N35° 38’ 30.5	W83° 41’ 33.9”	Wear Cove, Tenn.	76	32
K02–9–18C	Metcalf Phyllite	Phyllite	White mica	N35° 39’ 09.9”	W83° 41’ 50.4”	Wear Cove, Tenn.	193	32
K02–9–18D	Metcalf Phyllite	Phyllite	White mica	N35° 39’ 58.1”	W83° 42’ 48.6”	Wear Cove, Tenn.	79	32
K02–9–19B	Elkmont Fm	Metasandstone	White mica	N35° 28’ 02.6”	W83° 64’ 42.2”	Tapoco, N.C.	83	32
K02–9–19C	Thunderhead Ss	Metasandstone	White mica	N35° 26’ 57.2”	W83° 50’ 15.1”	Fontana Dam, N.C.	78	32
K02–9–19D	Anakeesta Fm	Muscovite garnet schist	White mica	N35° 26’ 27.0”	W83° 48’ 26.5”	Fontana Dam, N.C.	115	32
K02–9–19E	Wehutty Fm	Biotite schist	White mica	N35° 27’ 24.0”	W83° 28’ 18.2”	Bryson City, N.C.	85	32
K02–9–19E1	Wehutty Fm	Muscovite schist	White mica	N35° 27’ 24.0”	W83° 28’ 18.2”	Bryson City, N.C.	87	32
K02–9–19F	Thunderhead Ss	Metasandstone	White mica	N35° 26’ 47.9”	W83° 27’ 58.4”	Bryson City, N.C.	89	32
K02–9–19G	Mesoproterozic rocks	Mylonite	White mica	N35° 26’ 46.8”	W83° 24’ 03.7”	Bryson City, N.C.	199	32
K02–9–19J	Pegmatite	Pegmatite	White mica	N35° 28’ 35.4”	W83° 19’ 42.6”	Whittier, N.C.	197	32
K02–9–19K	Wading Branch Fm	Schist	White mica	N35° 28’ 27.6”	W83° 19’ 13.7”	Whittier, N.C.	107	32
K02–9–19L	Anakeesta Fm	Schist	White mica	N35° 36’ 33.9”	W83° 26’ 40.2”	Clingmans Dome, N.C.	110	32
K02–9–19M	Diorite	Metadiorite	White mica	N35° 43’ 37.1”	W83° 28’ 47.3”	Clingmans Dome, N.C.	111	32
K04–4–28A	Copperhill Fm	Kyanite schist	White mica	N35° 24’ 50”	W83° 42’ 55.5”	Tuskeegee, N.C.	222	43
K04–4–28B	Ammons Fm	Metagraywacke	White mica	N35° 23’ 36”	W83° 35’ 46”	Noland Ck, N.C.	220	43
K04–4–28C	Pegmatite	Pegmatite	White mica	N35° 25’ 30”	W83° 24’ 58”	Bryson City, N.C.	224	43
K04–4–28D	Copperhill Fm	Muscovite staurolite schist	White mica	N35° 26’ 43”	W83° 22’ 40”	Bryson City, N.C.	226	43
K04–7–13A	Copperhill Fm	Muscovite schist	White mica	N35° 24.235’	W83° 18.780’	Whittier, N.C.	197	43
K04–7–13B	Copperhill Fm	Graywacke	White mica	N35° 34.877’	W82° 21.056’	Smokemont, N.C.	199	43
K04–7–13C	Copperhill Fm	Kyanite schist	White mica	N35° 31.424’	W83° 18.354’	Smokemont, N.C.	201	43
K04–7–13D	Copperhill Fm	Kyanite schist	White mica	N35° 31.660’	W83° 14.228’	Bunches Bald, N.C.	203	43
K04–7–13E	Copperhill Fm	Kyanite schist	White mica	N35° 31.169’	W83° 10.628’	Bunches Bald, N.C.	205	43
K04–7–13F	Copperhill Fm	Kyanite schist	White mica	N35° 28.867’	W83° 10.629’	Silva North, N.C.	207	43
K04–7–13G	Copperhill Fm	Kyanite schist	White mica	N35° 26.738’	W83° 10.630’	Silva North, N.C.	209	43
K04–7–13H	Cartoogechaye	Kyanite schist	White mica	N35° 26.524’	W83° 10.631’	Hazelwood, N.C.	211	43
K04–7–13I	Cartoogechaye	Muscovite biotite schist	White mica	N35° 25.858’	W83° 10.632’	Hazelwood, N.C.	213	43

Table 1. Material dated, location of sample, and formation.—Continued

[Fm, formation]

Field no.	Unit	Rock type	Mineral dated	Latitude	Longitude	Quadrangle name	Packet	Package
			White mica/sericite—Continued					
K04–7–13K	Longarm	Quartzite	White mica	N35° 37.359’	W83° 10.633’	Bunches Bal, N.C.	219	43
K04–7–14A	Mesoproterozic rocks	Kyanite schist	White mica	N35° 36.201’	W83° 56.247’	Clyde, N.C.	298	43
K04–7–14B	Mesoproterozic rocks	Kyanite schist	White mica	N35° 33.956’	W82° 57.476’	Clyde, N.C.	304	43
K04–7–14E	Mesoproterozic rocks	Quartz vein	White mica	N35° 47.630’	W82° 54.895’	Lemon Gap, N.C.	314	43
K04–7–14F	Mesoproterozic rocks	Ultramylonite	White mica	N35° 45.224’	W82° 56.356’	Lemon Gap, N.C.	312	43
K04–7–14G	Mesoproterozic rocks	Mylonite	White mica	N34 45.522’	W82° 55.722’	Lemon Gap, N.C.	316	43
K04–7–14H	Mesoproterozic rocks	Protomylonitic saprolite	White mica	N35° 42.743’	W82° 49.712’	Sandy Mush, N.C.	318	43
K04–7–14J	Mesoproterozic rocks	Mylonite	White mica	N35° 50.474’	W82° 45.143’	Spring Creek, N.C.	322	43
K04–7–14K	Mesoproterozic rocks	Protomylonite	White mica	N35° 50.538’	W82° 41.929’	Marshall, N.C.	334	43
K04–7–14L	Mesoproterozic rocks	Mylonite	White mica	N35° 55.502’	W82° 37.206’	Sams Gap, N.C.	328	43
K04–7–14M	Mesoproterozic rocks	Mylonite	White mica	N35° 43.508’	W82° 32.969’	Weaverville, N.C.	330	43
K02–9–19A	Wilhite Fm	Slate	Groundmass	N35° 33’ 25.9”	W84 00’ 29.9”	Tallassee, Tenn.	81	32
K02–9–20A	Pigeon Siltstone	Siltstone	Groundmass	N35° 43’ 37.1	W83° 28’ 47.3”	Gatlinburg, Tenn.	112	32
			Biotite					
K02–9–19F	Thunderhead Fm	Meta sandstone	Biotite	N35° 26’ 47.9”	W83° 27’ 58.4”	Bryson City, N.C.	91	32
K02–9–19H	Mesoproterozic rocks	Biotite gneiss	Biotite	N35° 26’ 52.4”	W83° 24’ 03.7”	Bryson City, N.C.	95	32
K02–9–19I	Mesoproterozic rocks	Biotite amphibole gneiss	Biotite	N35° 27’ 06.8”	W83° 22’ 38.4”	Bryson City, N.C.	99	32
K02–9–19K	Wading Branch Fm	Kyanite schist	Biotite	N35°28’ 27.6”	W83° 19’ 13.7”	Whittier, N.C.	106	32
K04–7–13L	Wehutty Fm	Kyanite schist	Biotite	N35° 27.260’	W82° 29.775’	Bryson City, N.C.	296	43
K04–7–14A	Mesoproterozic rocks	Muscovite schist	Biotite	N35° 36.201’	W83° 56.247’	Clyde, N.C.	300	43
K04–7–14B	Mesoproterozic rocks	Kyanite schist	Biotite	N35° 33.956’	W82° 57.476’	Clyde N.C.	302	43
K04–7–14C	Mesoproterozic rocks	Amphibolite	Biotite	N35° 34.872’	W82° 59.241’	Clyde, N.C.	308	43
K04–7–14K	Mesoproterozic rocks	Protomylonite	Biotite	N35° 50.538’	W82° 41.929’	Marshall, N.C.	324	43
K04–7–14M	Mesoproterozic rocks	Mylonite	Biotite	N35° 43.508’	W82° 32.969’	Weaverville N.C.	332	43
			K-Feldspar					
K02–9–19G	Mesoproterozic rocks	mylonite	K-feldspar	N35° 26 46.8”	W83° 24’ 03.7”	Bryson City, N.C.	93	32
K02–9–19J	Pegmatite	Pegmatite	K-feldspar	N35° 28 35.4”	W83° 19’ 42.6”	Whittier, N.C.	103	32
K04–7–14D	Mesoproterozic rocks	Granite-granodiorite	K-feldspar	N35° 74.700’	W82° 55.745’	Lemon Gap, N.C.	310	43
K04–7–14I	Mesoproterozic rocks	Mylonite	K-feldspar	N35° 49.768’	W82° 47.968’	Spring Creek, N.C.	320	43
K04–7–14K	Mesoproterozic rocks	Protomylonite	K-feldspar	N35° 50.538’	W82° 41.929’	Marshall, N.C.	326	43

evacuated the front manifold and the mass spectrometer flight-tube between each incremental step. Prior to analyzing in the mass spectrometer, the gas was purified in the rear manifold by a SAES ST707 Zr-V-Fe getter operated at room temperature and a hot Re filament. A cold finger in the rear manifold, immersed in liquid N_2, was used to freeze out H_2O. Gas was equilibrated with the front manifold, then isolated and cleaned in the front manifold with a SAES ST101 Al-Zr getter operated at 400°C and a Ti getter operated at 350°C. An activated charcoal finger submerged in a thermally equilibrated mixture of dry ice and acetone in the front manifold was used to remove gasses with a molecular weight greater than 60 or 80 (primarily other noble gasses) prior to the expansion of the argon-dominated gas into the mass spectrometer. The gas was further purified in the mass spectrometer by a second SAES ST101 active gas getter operated at room temperature. The SAES ST101's successful operation could be monitored by the drop in counts of mass 44 (dominated by CO_2) after the first gas analysis cycle. Argon isotopes with masses 40 through 36 and CO_2 (mass 44) were analyzed as a function of time in five analytical cycles. For ^{40}Ar, ^{39}Ar, ^{38}Ar, and ^{37}Ar, peaks and baselines, were measured for five 1.28-second integrations in each of the five cycles. ^{36}Ar and baselines were measured for twenty 1.28-second integrations in each of the five cycles. After each analysis, the mass spectrometer was evacuated. All phases of the sample heating, cleanup, equilibration, and analysis were performed under computer control.

Many of the mineral samples were analyzed at the USGS in Denver with a MAP 216 mass spectrometer fitted with an electron multiplier using the $^{40}Ar/^{39}Ar$ step heating method of dating. The samples were heated as described above. The furnace and the rear and front manifolds were pumped between steps with a turbo molecular pump. An isolated ion pump was used to pump the mass spectrometer. Prior to mass spectrometer analysis, the gas was purified in the manifold by two SAES ST101 Al-Zr getters, one operated at room temperature and the other at 400ºC, and a hot Re filament. The argon-rich gas was further purified by a third SAES ST 101 getter operated at room temperature in the flight tube of the mass spectrometer. Argon isotopes with masses 40 through 36 were analyzed as a function of time in six analytical cycles. Baselines were measured for ^{39}Ar and ^{36}Ar. The ^{36}Ar baselines were subtracted from the ^{40}Ar, ^{38}Ar, ^{37}Ar and ^{36}Ar peaks. The ^{39}Ar baseline was subtracted from the ^{39}Ar peak to reduce the influence of the tail of the ^{40}Ar peak. All phases of the sample heating, cleanup, equilibration, and analysis were performed under computer control.

Isotopic Data Reduction

All the Ar isotopic data were reduced using an updated version of the computer programs ArAr* (Haugerud and Kunk, 1988) or Mass spec (Deino, 2001) and decay constants recommended by Steiger and Jäger (1977). The isotopic measurements made in the analysis had baseline values subtracted and then were regressed to time zero, using standard linear regression techniques. These regressed values and associated statistical estimates of analytical uncertainties of the time zero peak values were used in the data reduction. Full system blanks were measured prior to the suite of analyses made on each sample and then subtracted from the analytical results. Error estimates of the blanks were quadratically combined with the analytical errors and propagated through the error equations. Corrections for interfering reactor-produced argon isotopes from Ca, K, and Cl in the sample were made using the production ratios given in Dalrymple and others (1981) and Roddick (1983). Errors in calculating ages or ratios include analytical errors in the analysis; decay factor uncertainties; measured atmospheric or calculated initial $^{40}Ar:^{36}Ar$ ratios; the irradiation parameter J; the production ratios of the various reactor induced argon producing reactions; the initial $^{38}Ar:^{36}Ar$ ratio; and the age of the monitor (Haugerud and Kunk, 1988).

The tables and associated figures in this report include the identification of individual step ages, plateau ages, total gas ages, and inverse isochron ages. Total gas ages represent the age calculated from the addition of all the measured argon peaks for all steps, in a single sample. The total gas ages are roughly equivalent to conventional K-to-Ar ages. No analytical precision is calculated for total gas ages. Plateau ages were determined using the definition of Fleck, and others (1977) as modified by Haugerud and Kunk (1988). Inverse isotope correlation analysis of the analytical data to assess if nonatmospheric argon components were trapped in any samples and to calculate an inverse isochron age was done using the method of York (1969). All stated analytical uncertainties are 1 standard deviation (σ). Errors for the individual step ages do not include the error in the irradiation parameter J, errors for the production of interfering isotopes produced during neutron irradiation, or the uncertainty in the age of the monitor mineral. Only plateau and isochron ages include the uncertainty in the irradiation parameter J.

Results

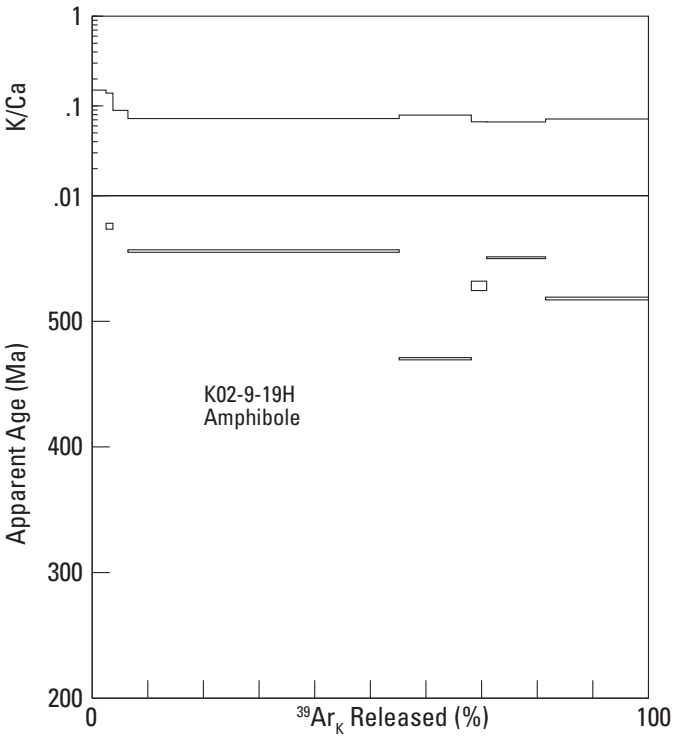
The $^{40}Ar/^{39}Ar$ geochronologic results presented in this report include tabular data (table 2) and one to three graphical representations of the age spectrum data on facing pages. Biotite samples have no associated figures. Each sample starts with a line that gives the sample number, the J-value used with its analytical uncertainty, the sample weight in grams, and the packet and package number from the irradiation. The table includes a letter designation for the individual argon analysis, the temperature of the step, the percentage of potassium-derived $^{39}Ar_K$ for each step, the radiogenic yield (percentage of ^{40}Ar that is derived from the decay of potassium), moles of $^{39}Ar_K$, a corrected $^{40}Ar:^{39}Ar_K$ ratio from which the age can be directly

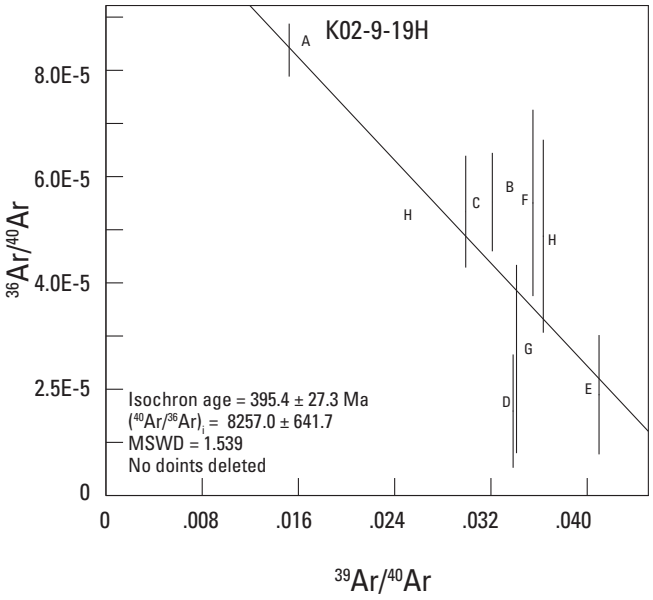
calculated, calculated apparent K:Ca and K:Cl ratios for each step (or asterisk if the measured ^{38}Ar or ^{37}Ar signal measured was less than the detection limit of the mass spectrometer), a calculated age for the step in millions of years, and an estimate of the precision of each age at the 1σ level. The sample precision includes estimates of the errors that are unique to a single sample and can be used only for comparisons with other steps of the same sample. This error estimate does not include the error in J. The second to last line in the age spectra datasets represents the total gas result for the sample. No analytical error is calculated for the age in this line because the age spectra are frequently disturbed and the error that could be calculated here would be geologically meaningless. The final line in the age specta datasets indicates if there was a plateau age. If the sample has an age plateau, then the percentage of ^{39}Ar on the plateau, the steps on the plateau, and the plateau age and its precision are reported. Plateau ages include the error in the irradiation parameter J.

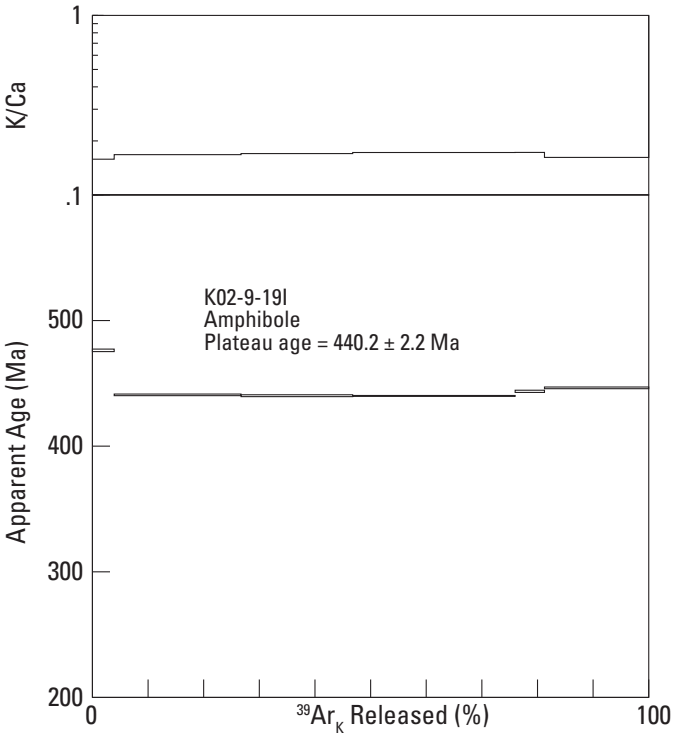
The figures associated with each age spectrum dataset include a graph that plots cumulative percent $^{39}Ar_K$ of the individual heating steps against apparent age in millions of years. Errors in age are graphically displayed at the 2σ level of confidence. In addition, some age spectra plots have an apparent K:Ca plot attached. For some samples, an inverse isotope correlation diagram is also included. Information within this diagram includes the isochron age and its error, the calculated initial ^{40}Ar:^{36}Ar ratio, the MSWD (mean standard weighted deviates) for the sample, and an indication of which points were used in the isochron. For additional information on the sample datasets, see Haugerud and Kunk (1988) and Deino (2001).

Table 2. $^{40}Ar/^{39}Ar$ analytical data.

Step	Temperature (^{o}C)	^{39}Ar [% of total	Radiogenic yield (%)	$^{39}Ar_k$ (moles)	$^{40}Ar^*/^{39}Ar_k$	Apparent K/Ca	Apparent K/Cl	Apparent age (Ma)	Error (Ma)
AMPHIBOLE									
K02-9-19H				*J=.012273*	*±0.5%*	*wt.=0.0501 g*		97KD32	
A	1000	2.5	97.5	2.73E-14	64.024	0.2	37	1046.05	1.20
B	1050	1.2	98.4	1.35E-14	30.629	0.1	44	575.69	1.17
C	1100	2.7	98.4	2.95E-14	32.913	0.1	30	612.07	0.80
D	1150	48.7	99.5	5.33E-13	29.410	0.1	29	555.96	0.50
E	1175	13.0	99.4	1.42E-13	24.261	0.1	36	470.18	0.44
F	1200	2.8	98.4	3.01E-14	27.718	0.1	25	528.22	1.87
G	1250	10.6	99.2	1.16E-13	29.082	0.1	26	550.62	0.35
H	1650	18.5	98.6	2.02E-13	27.109	0.1	29	518.14	0.55
Total gas			99.2	1.09E-12	29.209	0.1	30	552.69	
	No age plateau								
K02-9-19I				*J=.012321*	*±0.5%*	*wt.=0.0530 g*		101KD32	
A	1000	3.9	98.3	1.02E-13	24.521	0.2	62	476.25	0.50
B	1100	22.8	99.7	5.97E-13	22.467	0.2	94	440.85	0.32
C	1125	20.1	99.9	5.25E-13	22.429	0.2	98	440.18	0.38
D	1150	29.2	99.9	7.65E-13	22.419	0.2	99	440.00	0.17
E	1175	5.3	99.7	1.38E-13	22.628	0.2	99	443.63	0.43
F	1250	18.8	99.8	4.91E-13	22.788	0.2	99	446.42	0.33
Total gas			99.7	2.62E-12	22.594	0.2	96	443.06	
	72.08	% gas released on plateau in steps $1100^{0}C$ through $1150^{0}C$					Plateau age =	440.20	2.20


K/Ca
1
.1
.01
Apparent Age (Ma)
500
400
300
200
K02-9-19H
Amphibole
0
$^{39}Ar_K$ Released (%)
100


K02-9-19H
8.0E-5
6.0E-5
4.0E-5
2.5E-5
0
$^{36}Ar/^{40}Ar$
A
H
C
B
F
H
G
D
E
Isochron age = 395.4 ± 27.3 Ma
$(^{40}Ar/^{36}Ar)_i$ = 8257.0 ± 641.7
MSWD = 1.539
No doints deleted
0
.008
.016
.024
.032
.040
$^{39}Ar/^{40}Ar$


K/Ca
1
.1
Apparent Age (Ma)
500
400
300
200
K02-9-19I
Amphibole
Plateau age = 440.2 ± 2.2 Ma
0
$^{39}Ar_K$ Released (%)
100

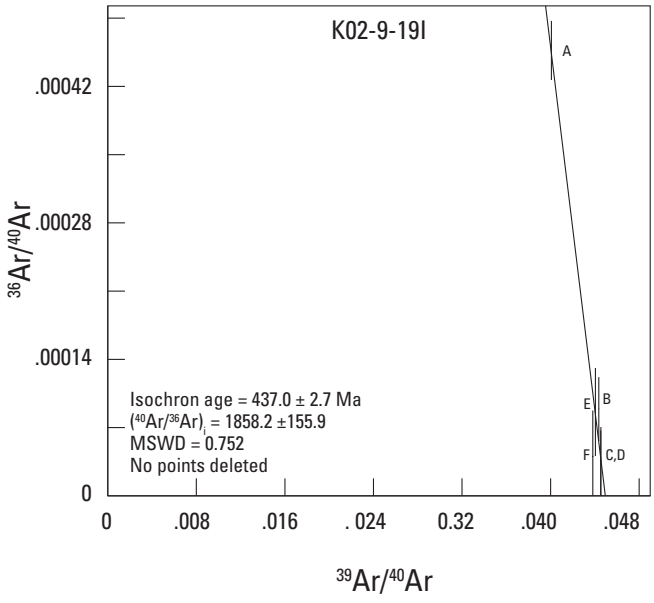
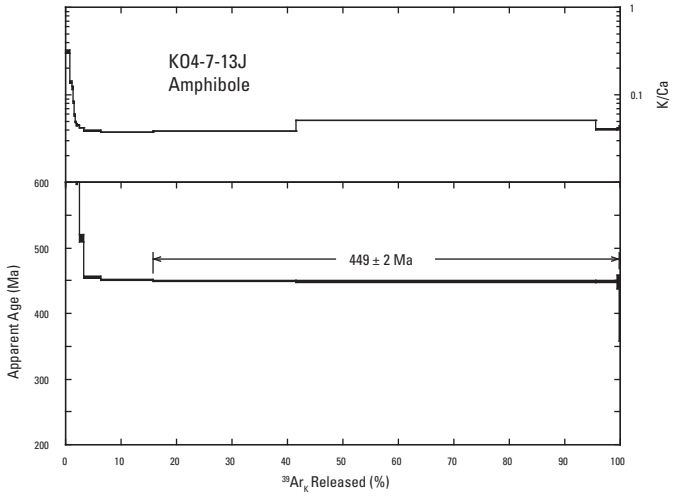
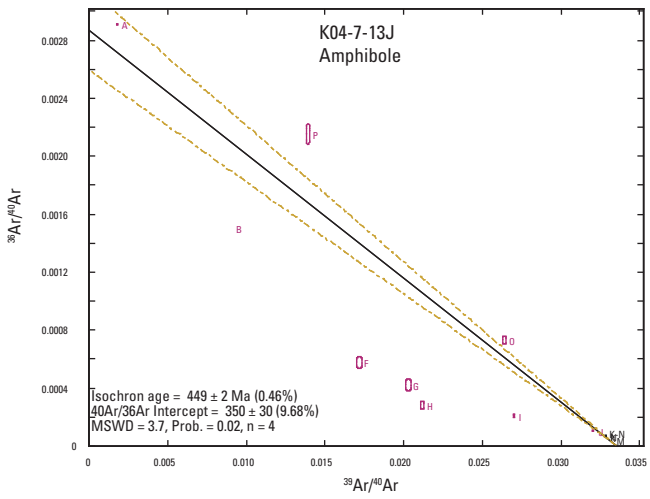
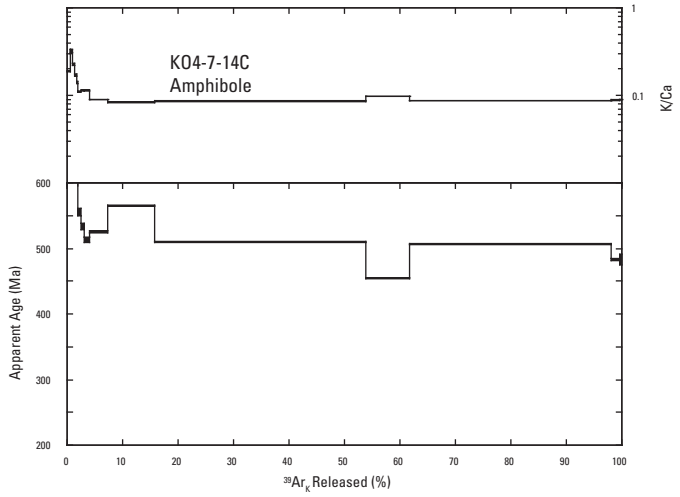

K02-9-19I
.00042
.00028
.00014
0
$^{36}Ar/^{40}Ar$
A
E
B
F
C,D
Isochron age = 437.0 ± 2.7 Ma
$(^{40}Ar/^{36}Ar)_i$ = 1858.2 ±155.9
MSWD = 0.752
No points deleted
0
.008
.016
. 024
0.32
.040
.048
$^{39}Ar/^{40}Ar$

Table 2. $^{40}Ar/^{39}Ar$ analytical data.-- Continued

Step	Temperature (^{o}C)	^{39}Ar (% of total	Radiogenic yield (%)	$^{39}Ar_k$ (moles)	$^{40}Ar^*/^{39}Ar_k$	Apparent K/Ca	Apparent K/Cl	Apparent age (Ma)	Error (Ma)
K04-7-13J				*J=.009485*	*±0.5%*	*wt.=0.01054 g*		217KD43	
A	950	0.8	14.1	2.67E-16	75.485	0.3	2	974.16	16.86
B	1000	0.4	55.6	1.34E-16	61.316	0.1	1	827.03	6.85
C	1050	0.1	90.3	4.27E-17	152.554	0.1	0	1614.38	14.55
D	1100	0.2	92.4	5.59E-17	159.080	0.1	0	1659.45	12.23
E	1150	0.2	92.6	6.43E-17	128.243	0.1	1	1435.82	10.24
F	1175	0.2	83.1	5.88E-17	48.155	0.0	1	678.71	10.73
G	1200	0.2	87.7	6.43E-17	43.036	0.0	1	617.55	10.09
H	1225	0.3	91.7	1.12E-16	43.243	0.0	1	620.07	6.01
I	1250	0.8	94.0	2.75E-16	34.789	0.0	1	514.45	2.82
J	1275	2.9	97.0	9.57E-16	30.271	0.0	1	455.36	1.13
K	1300	9.4	98.3	3.07E-15	29.925	0.0	1	450.76	0.44
L	1325	25.9	99.5	8.39E-15	29.838	0.0	1	449.60	0.37
M	1350	54.0	98.8	1.75E-14	29.776	0.1	1	448.77	0.45
N	1400	3.8	98.1	1.23E-15	29.834	0.0	1	449.54	0.80
O	1450	0.5	78.6	1.48E-16	29.722	0.0	1	448.05	5.00
P	1650	0.2	36.5	5.46E-17	26.137	0.0	1	399.55	21.32
Total gas								466.00	
	84.1 % of gas released on plateau in steps 1325^{0}C through 1450^{0}C					Plateau age =		449.00	2.00
K04-7-14C				*J=.009524*	*±0.5%*	*wt.=0.010249 g*		306KD43	
A	950	0.5	83.6	2.83E-16	83.246	0.2	1	1053.21	3.83
B	1000	0.2	89.1	8.85E-17	60.763	0.3	1	823.75	9.30
C	1050	0.3	92.8	1.69E-16	62.853	0.3	1	846.36	5.02
D	1100	0.3	92.9	2.01E-16	90.866	0.2	2	1124.80	4.47
E	1150	0.4	89.5	2.09E-16	56.535	0.2	3	777.14	4.35
F	1175	0.3	89.7	1.62E-16	45.515	0.1	3	649.66	5.38
G	1200	0.5	91.4	3.02E-16	37.857	0.1	3	555.46	3.08
H	1225	0.7	94.0	4.10E-16	36.141	0.1	3	533.65	2.44
I	1250	1.0	94.7	5.55E-16	34.542	0.1	3	513.10	1.88
J	1275	3.2	97.1	1.83E-15	35.524	0.1	5	525.74	0.79
K	1300	8.5	98.0	4.96E-15	38.638	0.1	7	565.29	0.43
L	1325	38.0	99.0	2.21E-14	34.239	0.1	9	509.18	0.49
M	1350	7.9	98.9	4.61E-15	30.075	0.1	1	454.39	0.46
N	1400	36.2	98.8	2.10E-14	34.072	0.1	4	507.01	0.48
O	1450	1.6	96.9	9.24E-16	32.205	0.1	4	482.63	1.04
P	1650	0.4	86.3	2.44E-16	32.260	0.1	2	483.35	4.13
Total gas								518.00	
	No age plateau								


K04-7-13J
Amphibole
449 ± 2 Ma
Apparent Age (Ma)
K/Ca
$^{39}Ar_K$ Released (%)


K04-7-13J
Amphibole
Isochron age = 449 ± 2 Ma (0.46%)
40Ar/36Ar Intercept = 350 ± 30 (9.68%)
MSWD = 3.7, Prob. = 0.02, n = 4
$^{36}Ar/^{40}Ar$
$^{39}Ar/^{40}Ar$


K04-7-14C
Amphibole
Apparent Age (Ma)
K/Ca
$^{39}Ar_K$ Released (%)

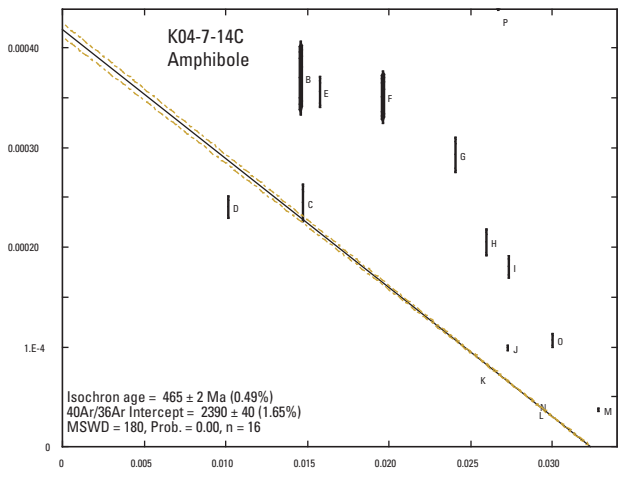
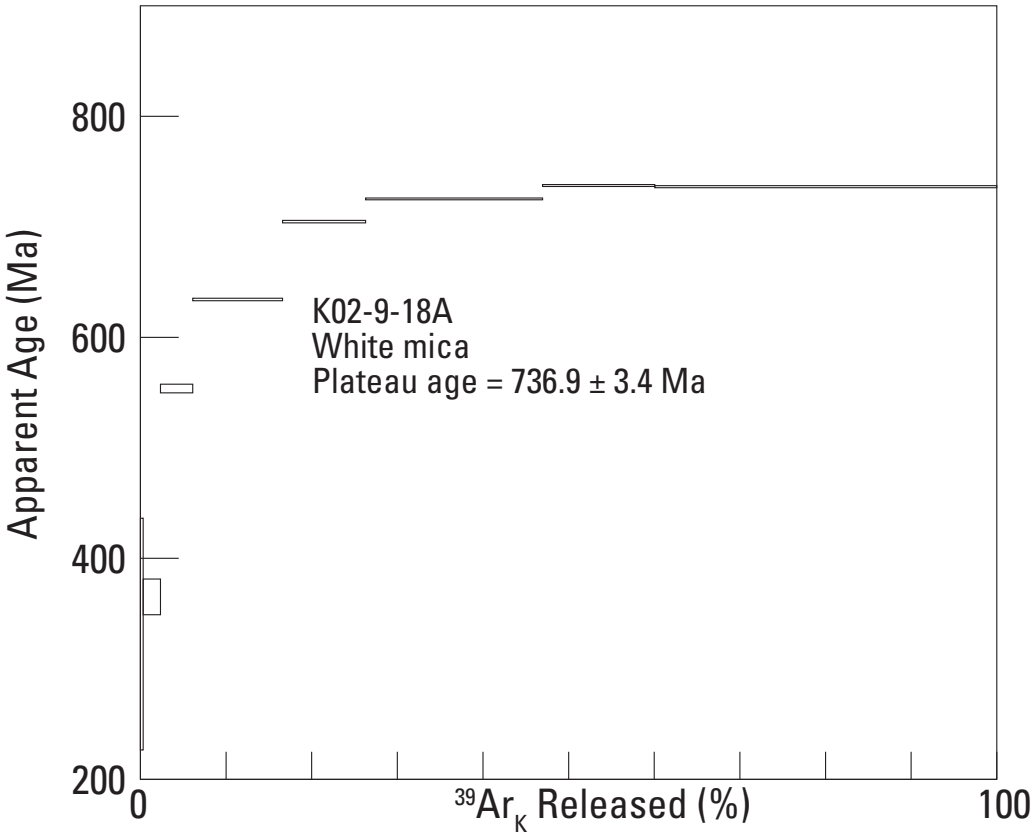

K04-7-14C
Amphibole
Isochron age = 465 ± 2 Ma (0.49%)
40Ar/36Ar Intercept = 2390 ± 40 (1.65%)
MSWD = 180, Prob. = 0.00, n = 16

Table 2. $^{40}Ar/^{39}Ar$ analytical data.-- Continued

Step	Temperature (^{o}C)	^{39}Ar (% of total	Radiogenic yield (%)	$^{39}Ar_k$ (moles)	$^{40}Ar^*/^{39}Ar_k$	Apparent K/Ca	Apparent K/Cl	Apparent age (Ma)	Error (Ma)
WHITE MICA									
K02-9-18A				*J=0.012400*	*±0.5%*	*wt.=0.000111 g*		198KD32	
A	650	0.3	6.2	1.80E-17	16.267	0.0	2	331.48	52.43
B	750	2.0	18.6	1.12E-16	18.094	1.6	4	365.17	8.09
C	850	3.8	87.5	2.10E-16	28.970	2.2	26	553.67	1.96
D	950	10.5	98.0	5.84E-16	33.977	3.8	366	634.26	0.54
E	1000	9.7	98.9	5.40E-16	38.545	8.4	546	704.75	0.58
F	1050	20.7	99.5	1.15E-15	39.908	8.8	1132	725.26	0.39
G	1100	13.1	99.3	7.29E-16	40.719	6.8	750	737.36	0.44
H	1150	39.9	85.6	2.22E-15	40.649	7.7	218	736.32	0.46
Total gas			91.3	5.60E-15	38.628	7.1	512	706.01	
	53.0 % of gas released on plateau in steps 1100^{0}C through 1150^{0}C						Plateau age =	736.90	3.38
K02-9-18B				*J=.012368*	*±0.5%*	*wt.=0.0020 g*		#76KD32	
A	650	3.0	87	1.14E-14	13.140	15.4	78	271.66	2.47
B	750	6.0	99	2.28E-14	18.241	41.6	4131	367.00	1.32
C	850	18.0	99.8	6.86E-14	17.567	79.4	***	354.69	0.44
D	950	35.2	99.8	1.34E-13	17.398	80.5	***	351.59	0.28
E	1050	27.0	99.9	1.03E-13	17.545	24.2	***	354.28	0.48
F	1100	9.0	99.9	3.43E-14	17.972	11.2	31382	362.09	0.91
G	1150	1.5	97.4	5.65E-15	18.368	2.8	466	369.31	7.78
H	1200	0.5	92.6	1.74E-15	23.579	0.4	188	461.64	17.68
Total gas			99.3	3.82E-13	17.486	53.1	3073	353.19	
	No age plateau								


800
600
400
200
Apparent Age (Ma)
K02-9-18A
White mica
Plateau age = 736.9 ± 3.4 Ma
0
$^{39}Ar_K$ Released (%)
100

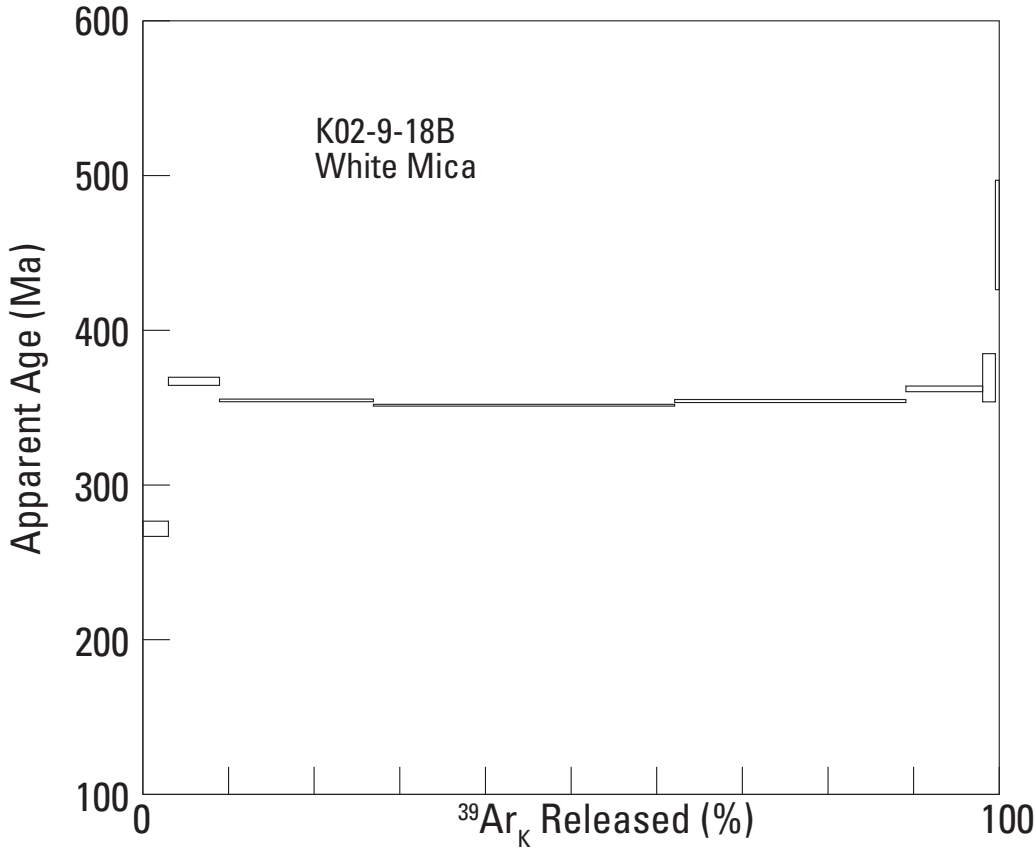
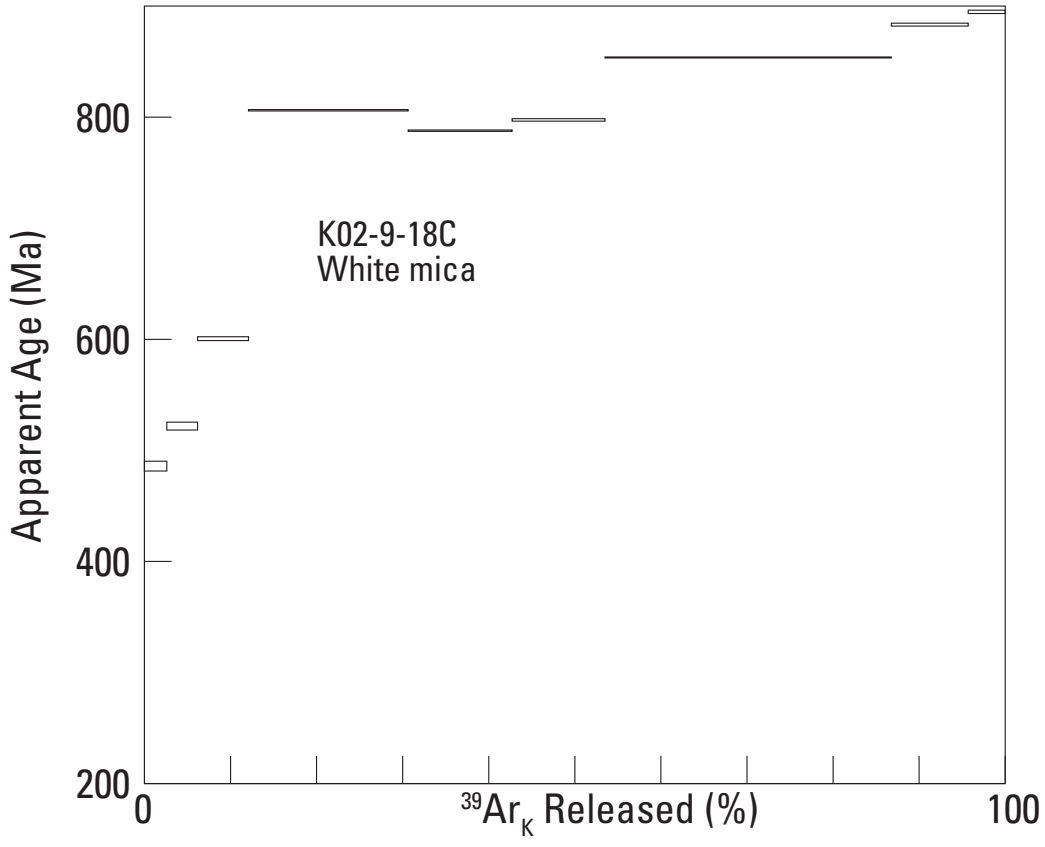
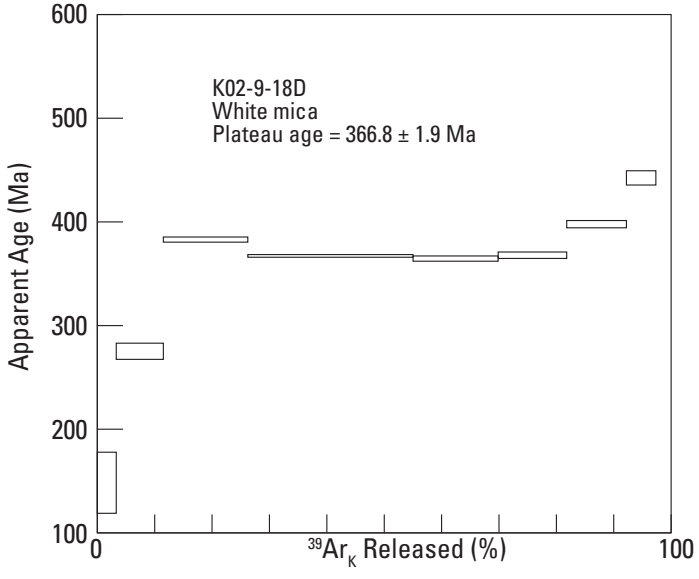

600
500
400
300
200
100
Apparent Age (Ma)
K02-9-18B
White Mica
0
$^{39}Ar_K$ Released (%)
100

Table 2. $^{40}Ar/^{39}Ar$ analytical data.-- Continued

Step	Temperature (^{o}C)	^{39}Ar [% of total	Radiogenic yield (%)	$^{39}Ar_k$ (moles)	$^{40}Ar^*/^{39}Ar_k$	Apparent K/Ca	Apparent K/Cl	Apparent age (Ma)	Error (Ma)
K02-9-18C				*J=.012401*	*±0.5%*	*wt.=0.001464 g*		193KD32	
A	750	2.6	97.9	1.14E-14	24.926	33.0	792	485.90	2.21
B	800	3.6	98.3	1.56E-14	27.054	32.6	1842	521.91	1.79
C	850	5.9	99.4	2.59E-14	31.856	93.6	3237	600.61	0.86
D	900	18.5	99.9	8.10E-14	45.439	182.5	8999	806.24	0.30
E	950	12.1	99.7	5.28E-14	44.160	122.7	6233	787.85	0.33
F	1000	10.8	99.8	4.71E-14	44.835	148.6	4831	797.58	0.55
G	1100	33.3	99.9	1.45E-13	48.803	97.0	7247	853.75	0.21
H	1150	8.9	99.9	3.90E-14	50.945	205.9	6148	883.36	0.66
I	1350	4.3	99.7	1.88E-14	51.785	26.5	2298	894.83	0.73
Total gas			99.7	4.37E-13	45.110	124.0	6280	801.53	
	No age plateau								
K02-9-18D				*J=0.012372*	*±0.5%*	*wt.=0.000382 g*		79KD32	
A	650	3.3	3.4	6.10E-17	6.930	1.6	5	148.39	14.72
B	750	8.2	29.5	1.52E-16	13.321	23.9	17	275.20	3.92
C	850	14.7	87.7	2.72E-16	19.115	4.0	308	382.95	1.24
D	950	28.8	98.0	5.32E-16	18.246	8.1	1276	367.19	0.65
E	1000	14.8	97.8	2.74E-16	18.105	129.5	1139	364.63	1.26
F	1050	11.9	96.9	2.21E-16	18.280	5.5	506	367.82	1.55
G	1100	10.4	99.2	1.92E-16	19.942	45.3	827	397.82	1.75
H	1150	5.1	96.4	9.50E-17	22.466	0.0	270	442.44	3.43
I	1200	1.5	87.9	2.80E-17	34.292	0.6	73	638.00	10.30
J	1250	0.4	49.9	8.00E-18	62.667	0.4	14	1035.46	38.20
K	1300	0.4	75.3	8.00E-18	91.895	0.2	22	1369.90	24.50
L	1350	0.3	76.4	5.00E-18	147.423	0.1	14	1872.78	40.83
Total gas			87.1	1.80E-15	19.066	29.5	745	382.06	
	55.6 % of gas released on plateau in steps $950^{0}C$ through $1050^{0}C$						Plateau age =	366.79	1.86


K02-9-18C
White mica
Apparent Age (Ma)
800
600
400
200
0
100
$^{39}Ar_K$ Released (%)


K02-9-18D
White mica
Plateau age = 366.8 ± 1.9 Ma
Apparent Age (Ma)
600
500
400
300
200
100
0
100
$^{39}Ar_K$ Released (%)

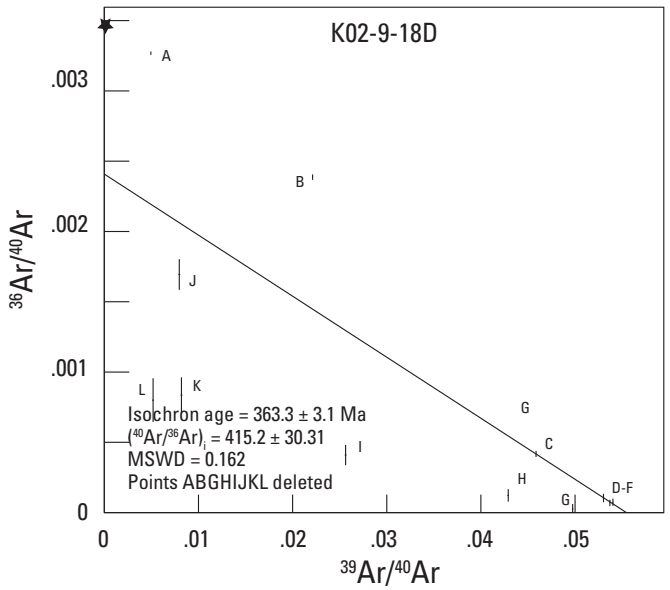
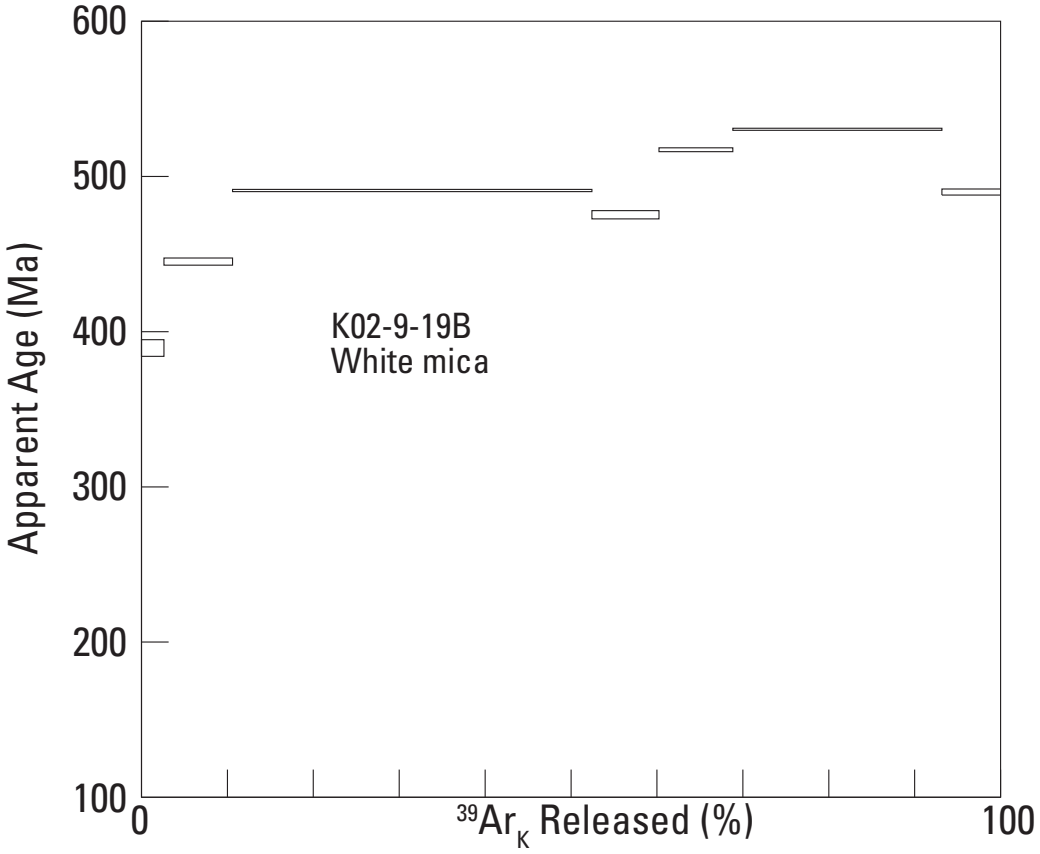

K02-9-18D
A
B
J
L
K
I
G
C
H
G
D-F
Isochron age = 363.3 ± 3.1 Ma
$(^{40}Ar/^{36}Ar)_i$ = 415.2 ± 30.31
MSWD = 0.162
Points ABGHIJKL deleted
$^{36}Ar/^{40}Ar$
.003
.002
.001
0
0
.01
.02
.03
.04
.05
$^{39}Ar/^{40}Ar$

Table 2. $^{40}Ar/^{39}Ar$ analytical data.-- Continued

Step	Temperature (°C)	^{39}Ar [% of total	Radiogenic yield (%)	$^{39}Ar_k$ (moles)	$^{40}Ar^*/^{39}Ar_k$	Apparent K/Ca	Apparent K/Cl	Apparent age (Ma)	Error (Ma)
K02-9-19B				*J=.012347*	*±0.5%*	*wt.=0.00105 g*		83KD32	
A	750	2.6	99.5	7.68E-15	19.516	87.2	530	389.47	2.71
B	850	8.0	99.8	2.35E-14	22.667	111.2	3180	445.15	1.15
C	950	41.8	99.9	1.23E-13	25.332	254.3	***	490.95	0.37
D	1000	7.8	99.9	2.30E-14	24.417	93.7	3164	475.35	1.34
E	1050	8.6	99.9	2.52E-14	26.890	97.0	1850	517.20	0.62
F	1100	24.3	100	7.16E-14	27.683	557.9	9434	530.40	0.34
G	1150	6.8	99.8	2.01E-14	25.274	165.7	***	489.97	0.96
Total gas			99.9	2.94E-13	25.598	280.3	2970	495.45	
	No age plateau								
K02-9-19C				*J=0.012371*	*±0.5%*	*wt.=0.000314 g*		78KD32	
A	650	0.3	5.2	4.67E-17	7.442	0.7	1	159.27	42.10
B	750	1.1	26.1	1.86E-16	15.318	1.3	1	313.83	10.56
C	850	1.8	86.7	3.13E-16	18.962	0.8	5	381.09	5.47
D	950	5.4	98.0	9.61E-16	20.359	3.4	50	406.24	1.86
E	1000	4.8	98.7	8.46E-16	20.052	5.5	61	400.74	2.04
F	1050	15.9	99.3	2.84E-15	20.915	8.6	90	416.14	0.80
G	1100	13.6	99.5	2.43E-15	20.071	11.0	86	401.08	0.85
H	1150	11.9	99.6	2.13E-15	20.214	5.7	94	403.64	0.97
I	1200	24.9	99.7	4.34E-15	21.195	10.5	99	421.11	0.61
J	1250	10.8	98.8	1.88E-15	23.141	7.2	78	455.28	1.02
K	1300	3.5	99.0	6.28E-16	22.636	1.5	64	446.47	2.74
L	1350	3.5	98.7	6.12E-16	21.345	2.1	82	423.81	2.78
M	1450	2.5	98.1	4.35E-16	22.360	4.6	89	441.65	3.83
N	1650	0.1	100.0	1.79E-17	26.980	0.7	145	520.92	75.16
Total gas			98.0	1.77E-14	20.960	7.6	83	416.60	
	No age plateau								


600
500
400
300
200
100
Apparent Age (Ma)
K02-9-19B
White mica
0
100
$^{39}Ar_K$ Released (%)

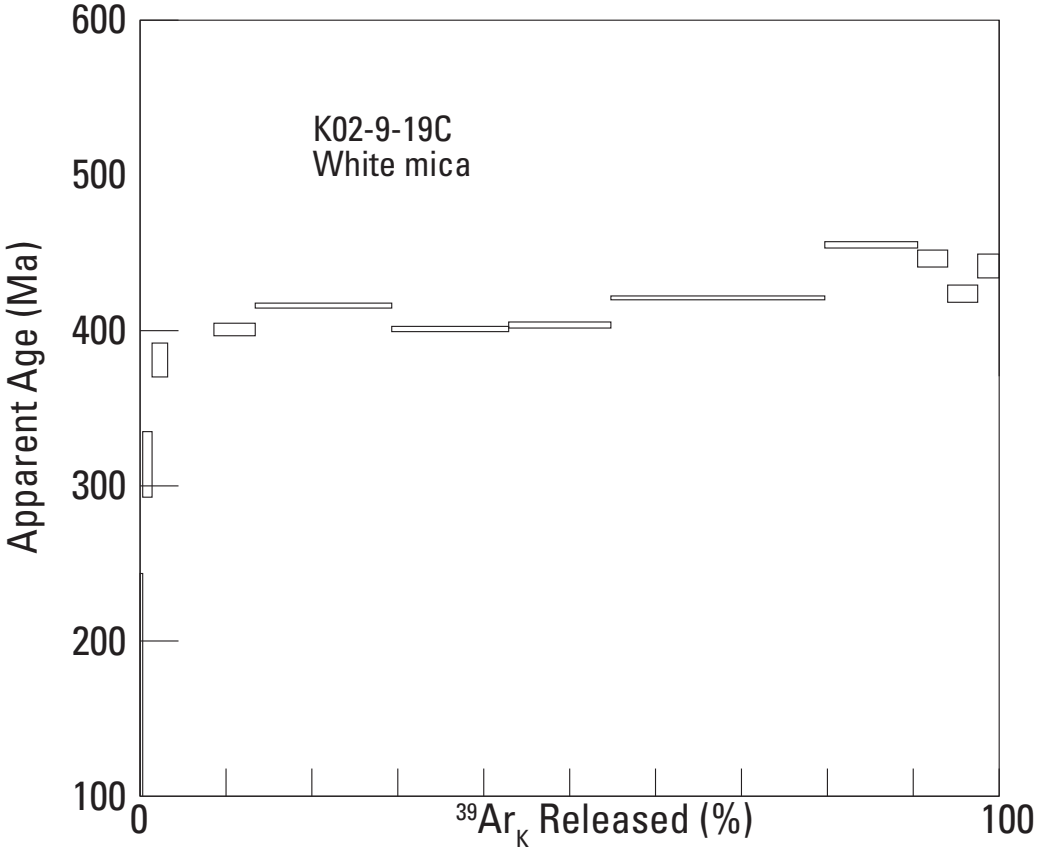
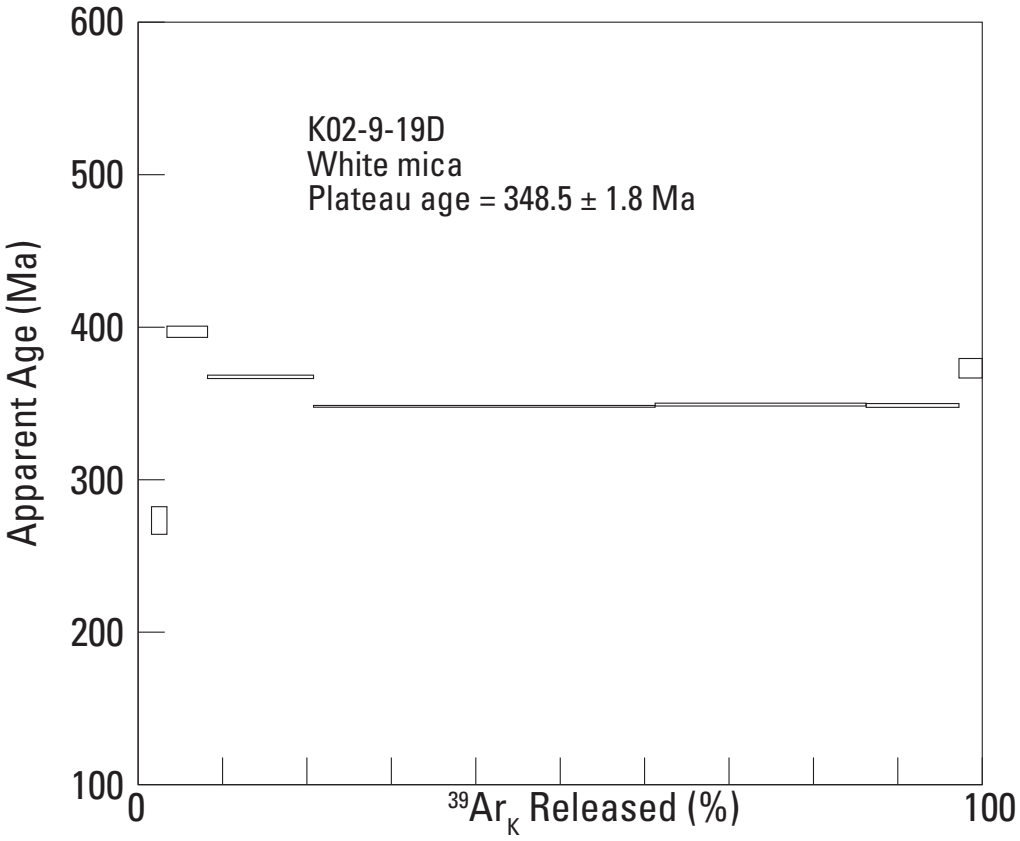

600
500
400
300
200
100
Apparent Age (Ma)
K02-9-19C
White mica
0
100
$^{39}Ar_K$ Released (%)

Table 2. $^{40}Ar/^{39}Ar$ analytical data.-- Continued

Step	Temperature (^{o}C)	^{39}Ar [% of total	Radiogenic yield (%)	$^{39}Ar_k$ (moles)	$^{40}Ar^*/^{39}Ar_k$	Apparent K/Ca	Apparent K/Cl	Apparent age (Ma)	Error (Ma)
K02-9-19D				*J=.012341*	*±0.5%*	*wt.=0.0021 g*		115KD32	
A	550	1.6	11.6	6.66E-15	3.369	14.5	21	73.48	8.12
B	650	1.8	86.2	7.65E-15	13.252	19.9	95	273.26	4.51
C	750	4.8	99.1	2.02E-14	19.947	53.1	1811	397.01	1.83
D	850	12.6	99.7	5.27E-14	18.307	60.7	***	367.47	0.56
E	950	40.5	99.8	1.70E-13	17.249	71.4	***	348.15	0.29
F	1050	25.0	99.8	1.05E-13	17.308	85.6	***	349.24	0.45
G	1150	11.0	99.7	4.62E-14	17.278	203.1	***	348.69	0.64
H	1250	2.8	97.3	1.16E-14	18.618	17.1	902	373.11	3.18
Total gas			98	4.20E-13	17.275	83.9	114	348.62	
	76.5% gas released on plateau in steps $950^{0}C$ through $1150^{0}C$						Plateau age =	348.50	1.77
K02-9-19E				*J=.012354*	*±0.5%*	*wt.=0.0022 g*		85KD32	
A	550	1.4	17.8	7.10E-15	8.243	17.5	30	174.95	7.90
B	650	1.3	79.6	7.04E-15	22.795	22.6	73	447.61	5.56
C	750	13.2	97.5	6.92E-14	32.089	191.9	1002	602.38	0.67
D	850	29.8	99.5	1.56E-13	33.208	490.4	11237	620.16	0.31
E	950	19.1	99	1.00E-13	33.368	269.0	2383	622.68	0.57
F	1000	24.0	99.7	1.25E-13	33.721	401.4	8958	628.25	0.32
G	1050	10.6	99.7	5.57E-14	33.404	130.2	***	623.25	0.76
H	1250	0.5	94.6	2.75E-15	27.659	5.8	330	530.27	17.13
Total gas			97.8	5.24E-13	32.727	333.7	6088	612.54	
	No age plateau								


K02-9-19D
White mica
Plateau age = 348.5 ± 1.8 Ma
Apparent Age (Ma)
600
500
400
300
200
100
0
100
$^{39}Ar_K$ Released (%)

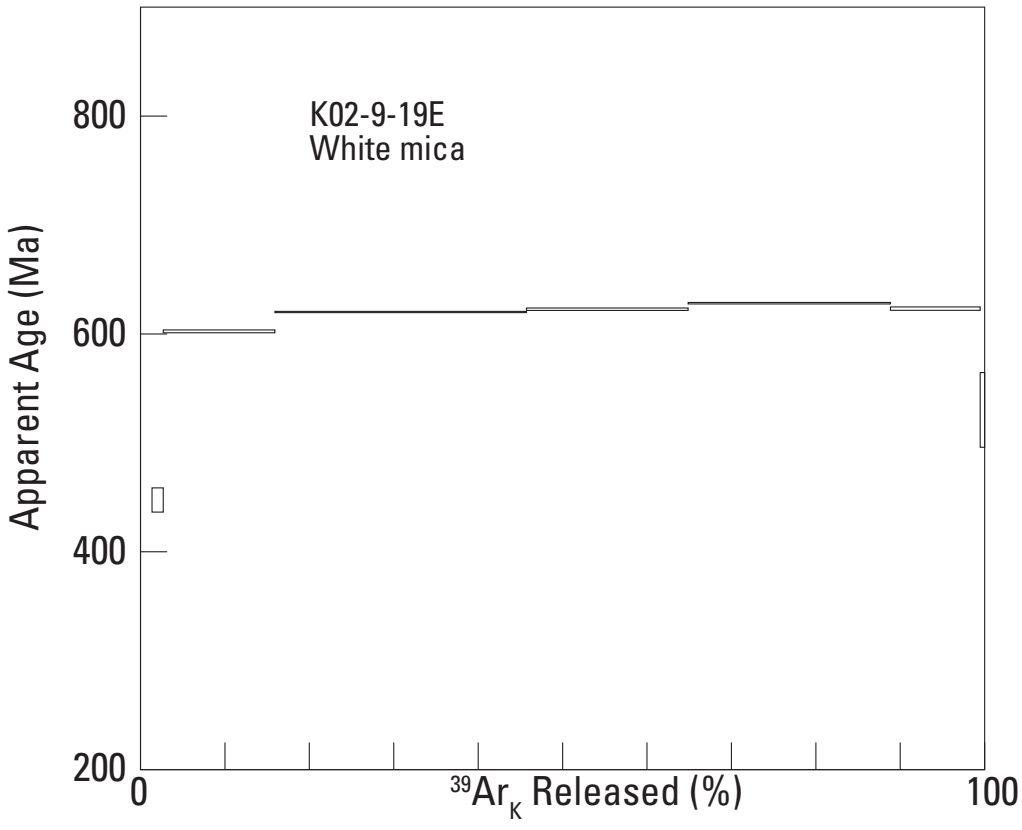
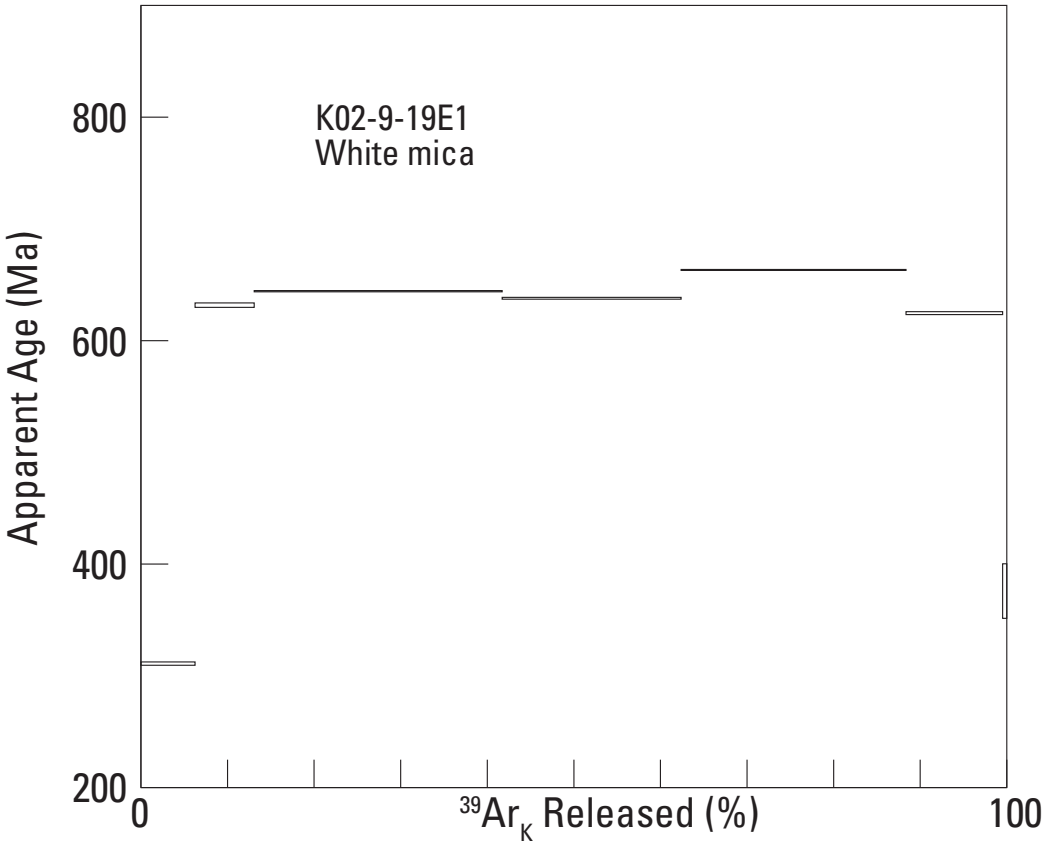
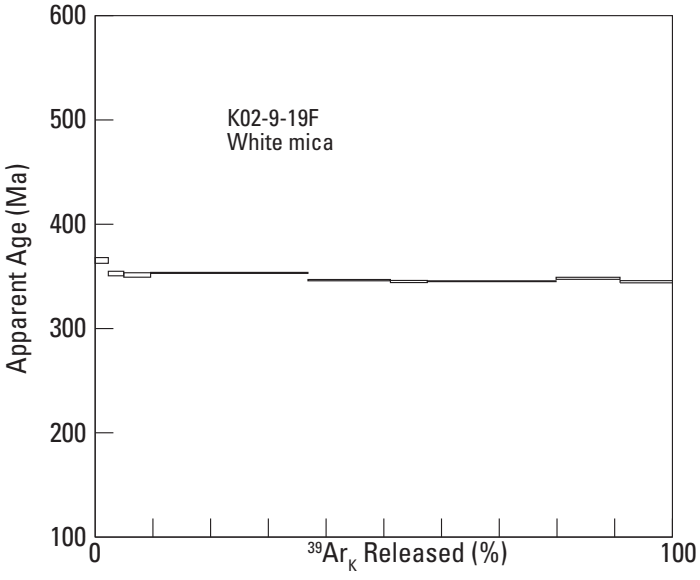

K02-9-19E
White mica
Apparent Age (Ma)
800
600
400
200
0
100
$^{39}Ar_K$ Released (%)

Table 2. $^{40}Ar/^{39}Ar$ analytical data.-- Continued

Step	Temperature (°C)	^{39}Ar [% of total	Radiogenic yield (%)	$^{39}Ar_k$ (moles)	$^{40}Ar^*/^{39}Ar_k$	Apparent K/Ca	Apparent K/Cl	Apparent age (Ma)	Error (Ma)
K02-9-19E1				*J=.012360*	*±0.5%*	*wt.=0.0022 g*		87KD32	
A	550	6.2	43.8	2.53E-14	15.218	62.6	61	310.92	0.75
B	650	6.8	91.5	2.76E-14	33.931	153.8	297	631.80	1.00
C	750	28.6	97.3	1.16E-13	34.730	344.9	1508	644.31	0.28
D	850	20.7	98	8.35E-14	34.321	429.9	2626	637.92	0.38
E	950	26.0	97.1	1.05E-13	35.952	441.2	1392	663.29	0.19
F	1050	11.2	98.7	4.51E-14	33.476	214.2	3098	624.65	0.63
G	1100	0.5	84.5	1.96E-15	18.742	8.5	179	375.87	12.19
Total gas			93.8	4.04E-13	33.472	340.5	1707	624.58	
	No age plateau								
K02-9-19F				*J=.012367*	*±0.5%*	*wt.=0.0021 g*		89KD32	
A	750	2.3	97	0.01483	18.151	29.42	678	365.32	1.38
B	800	2.7	97.4	0.01749	17.461	56.31	1362	352.71	1.1
C	850	4.7	98.1	0.030315	17.388	66.24	2620	351.37	1.07
D	900	27.2	99.3	0.17757	17.495	255.48	294581	353.33	0.23
E	950	14.3	99.3	0.09316	17.116	146.37	25094	346.37	0.3
F	1000	6.4	98.6	0.041729	17.046	82.17	3700	345.09	0.51
G	1100	22.3	99.2	0.145361	17.06	272.39	8793	345.34	0.21
H	1150	11.1	99.5	0.07224	17.212	254.77	62570	348.15	0.49
I	1350	9.1	98.7	0.059122	17.034	169.38	5752	344.86	0.55
Total gas		100	99	0.6518	17.251	205.39	93665	348.85	
	No age plateau								


K02-9-19E1
White mica
Apparent Age (Ma)
800
600
400
200
0
100
$^{39}Ar_K$ Released (%)


K02-9-19F
White mica
Apparent Age (Ma)
600
500
400
300
200
100
0
100
$^{39}Ar_K$ Released (%)

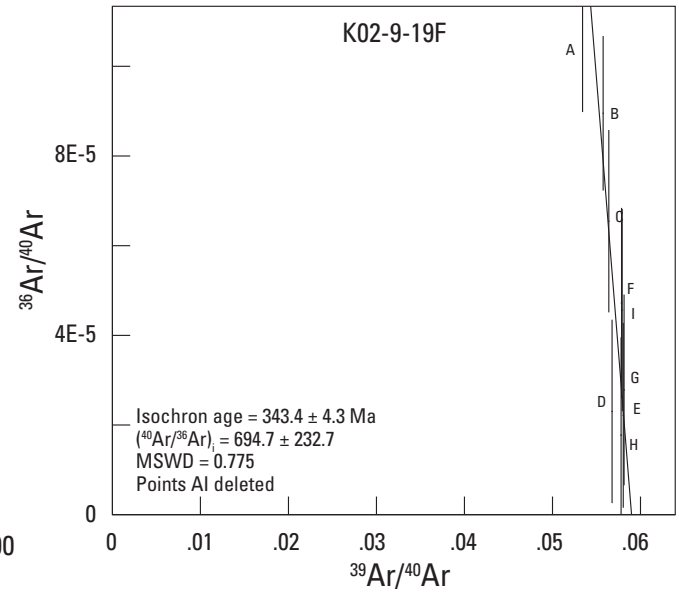
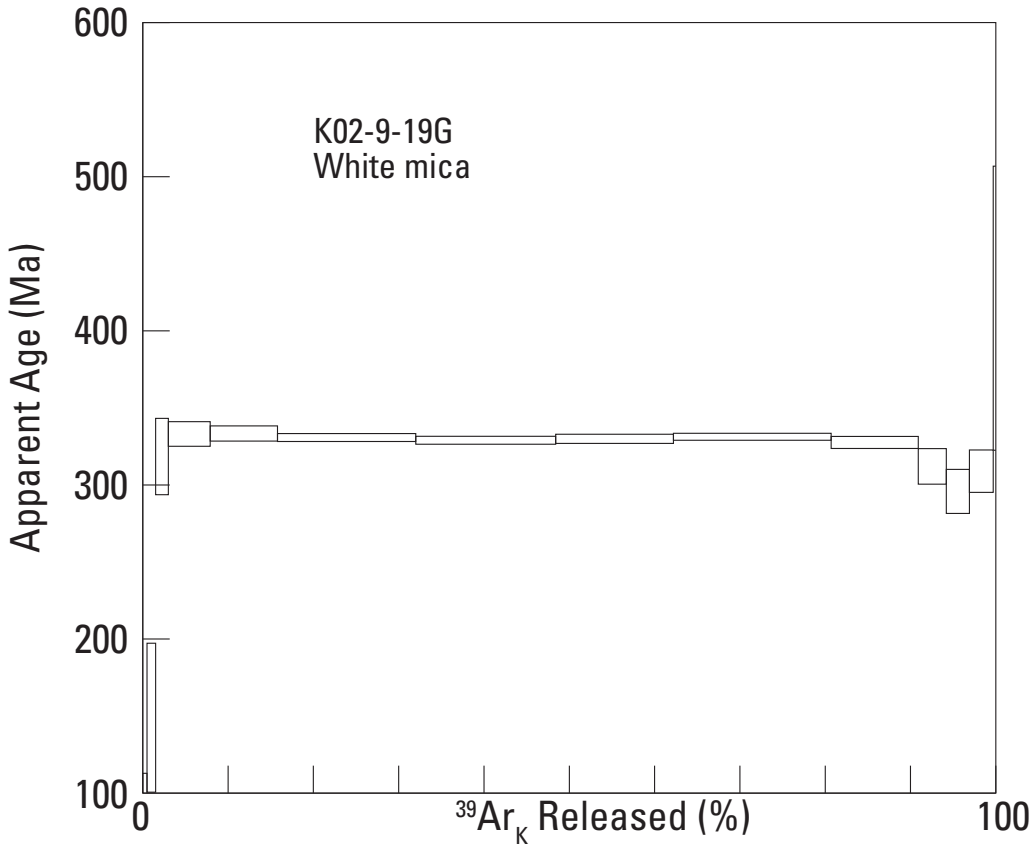
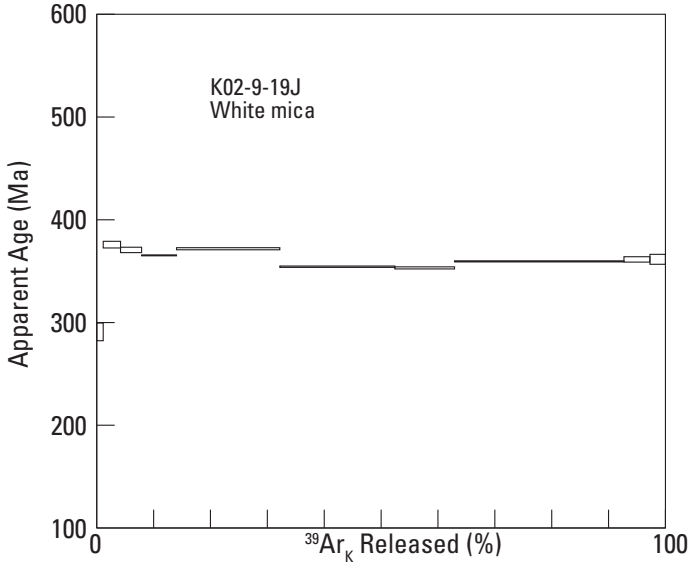

K02-9-19F
A
B
C
F
I
G
D
E
H
Isochron age = 343.4 ± 4.3 Ma
$(^{40}Ar/^{36}Ar)_i$ = 694.7 ± 232.7
MSWD = 0.775
Points AI deleted
$^{36}Ar/^{40}Ar$
8E-5
4E-5
0
0
.01
.02
.03
.04
.05
.06
$^{39}Ar/^{40}Ar$

Table 2. $^{40}Ar/^{39}Ar$ analytical data.-- Continued

Step	Temperature (°C)	^{39}Ar [% of total	Radiogenic yield (%)	$^{39}Ar_k$ (moles)	$^{40}Ar^*/^{39}Ar_k$	Apparent K/Ca	Apparent K/Cl	Apparent age (Ma)	Error (Ma)
K02-9-19G				*J=0.012401*	*±0.5%*	*wt.=0.000175 g*		199KD32	
A	650	0.5	0.0	***	0.005	0.7	0	0.12	56.38
B	750	1.0	9.5	***	6.939	1.1	0	148.94	24.17
C	850	1.5	80.2	***	15.562	1.3	0	318.41	12.39
D	950	4.9	95.5	***	16.345	3.4	25	333.04	3.99
E	1000	7.9	98.0	***	16.361	8.2	63	333.34	2.46
F	1050	16.2	99.1	***	16.221	11.6	102	330.73	1.29
G	1100	16.4	99.1	***	16.127	7.8	99	328.98	1.28
H	1150	13.8	99.6	***	16.177	11.4	89	329.90	1.48
I	1200	18.5	99.2	***	16.247	12.7	100	331.22	1.13
J	1250	10.2	96.2	***	16.053	5.8	73	327.59	1.96
K	1300	3.3	95.8	***	15.223	1.6	65	312.03	5.78
L	1350	2.7	93.1	***	14.364	2.2	71	295.79	7.14
M	1450	2.8	92.0	***	15.057	3.2	0	308.91	6.89
N	1650	0.4	37.7	***	20.831	0.4	1	414.65	46.09
Total gas			96.3	***	15.940	8.7	81	325.30	
	No age plateau								
K01-9-19J				*J=.012399*	*±0.5%*	*wt.=0.0021 g*		197KD32	
A	650	1.1	64.3	5.69E-15	14.112	10.8	11	290.89	4.30
B	750	3.0	97.6	1.51E-14	18.679	41.1	41	375.80	1.62
C	800	3.7	99.3	1.84E-14	18.394	64.1	141	370.62	1.31
D	850	6.1	98.6	3.06E-14	18.108	135.7	4931	365.40	0.21
E	900	18.2	98.9	9.03E-14	18.460	259.8	40466	371.82	0.52
F	950	20.2	99.5	1.01E-13	17.503	207.7	***	354.32	0.34
G	1000	10.5	99.4	5.22E-14	17.442	105.5	20985	353.19	0.51
H	1100	29.8	99.3	1.48E-13	17.787	355.5	191109	359.52	0.28
I	1150	4.6	99.4	2.28E-14	17.890	80.3	5674	361.41	1.32
J	1350	2.7	99.4	1.35E-14	17.896	522.5	1755	361.52	2.43
Total gas			98.8	4.97E-13	17.851	236.1	67101	360.69	
	No age plateau								


K02-9-19G
White mica
Apparent Age (Ma)
600
500
400
300
200
100
0
100
$^{39}Ar_K$ Released (%)


K02-9-19J
White mica
Apparent Age (Ma)
600
500
400
300
200
100
0
100
$^{39}Ar_K$ Released (%)

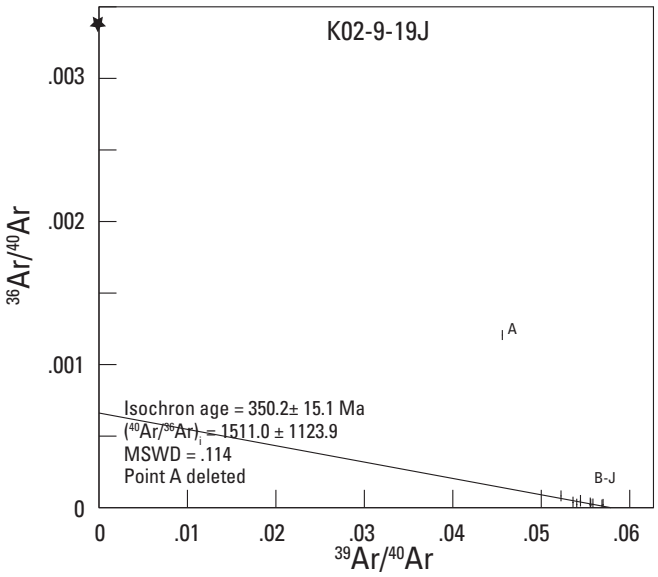
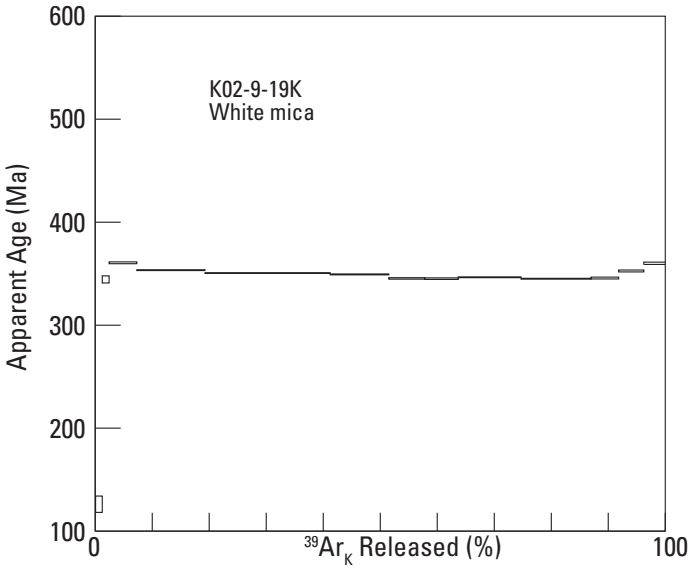
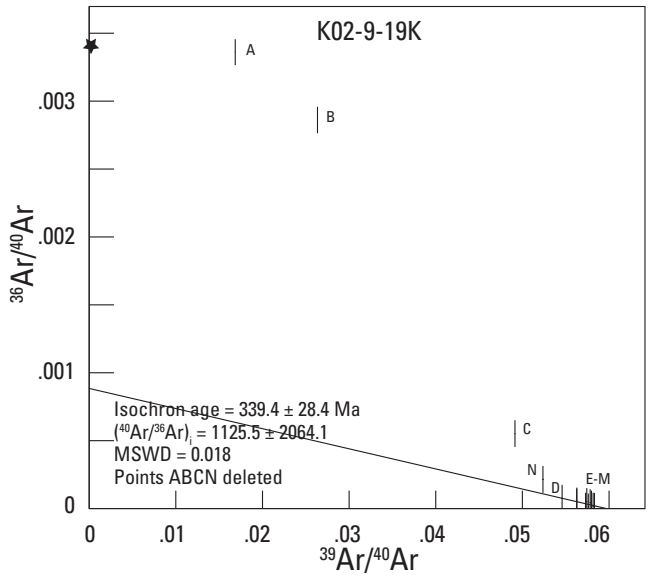

K02-9-19J
$^{36}Ar/^{40}Ar$
.003
.002
.001
0
A
Isochron age = 350.2± 15.1 Ma
$(^{40}Ar/^{36}Ar)_i$ = 1511.0 ± 1123.9
MSWD = .114
Point A deleted
B-J
0
.01
.02
.03
.04
.05
.06
$^{39}Ar/^{40}Ar$

Table 2. $^{40}Ar/^{39}Ar$ analytical data.-- Continued

Step	Temperature (°C)	^{39}Ar [% of total	Radiogenic yield (%)	$^{39}Ar_k$ (moles)	$^{40}Ar^*/^{39}Ar_k$	Apparent K/Ca	Apparent K/Cl	Apparent age (Ma)	Error (Ma)
K02-9-19K				*J=0.012353*	*±0.5%*	*wt.=0.000292 g*		107KD32	
A	650	0.1	0.7	1.10E-17	0.409	***	3	9.08	37.17
B	750	1.2	15.5	1.95E-16	5.863	3.2	3	126.14	3.99
C	850	1.2	83.7	2.00E-16	17.028	2.7	138	344.40	1.74
D	950	4.9	97.8	8.08E-16	17.910	5.2	1335	360.55	0.44
E	1000	11.9	98.6	1.99E-15	17.519	14.4	3196	353.41	0.20
F	1050	22.0	99.5	3.65E-15	17.362	19.5	4388	350.53	0.14
G	1100	10.3	99.6	1.71E-15	17.295	28.8	4517	349.31	0.22
H	1150	6.3	99.0	1.05E-15	17.082	3.2	1063	345.39	0.36
I	1200	5.9	98.7	9.78E-16	17.069	12.1	***	345.14	0.38
J	1250	11.0	98.5	1.83E-15	17.143	18.3	2302	346.52	0.20
K	1300	12.3	99.5	2.04E-15	17.066	12.6	4371	345.09	0.20
L	1350	4.9	99.5	8.07E-16	17.100	5.7	2992	345.73	0.45
M	1450	4.4	98.4	7.33E-16	17.476	8.3	2342	352.63	0.48
N	1650	3.8	93.7	6.27E-16	17.884	***	1184	360.08	0.56
Total gas			97.6	1.66E-14	17.167	14.4	3027	346.96	
	No age plateau								
K02-9-19L				*J=.012362*	*±0.5%*	*wt.=0.0020 g*		110KD32	
A	550	1.4	36.4	7.11E-15	10.084	19.0	31	211.94	4.23
B	650	0.9	95.5	4.55E-15	15.659	12.2	291	319.23	5.66
C	750	4.3	99.2	2.13E-14	17.661	57.9	3721	356.25	1.08
D	850	16.8	99.9	8.32E-14	17.361	131.6	***	350.74	0.54
E	950	37.2	99.9	1.84E-13	17.676	238.5	***	356.52	0.26
F	1050	27.8	99.9	1.38E-13	18.552	57.2	***	372.49	0.24
G	1150	9.5	99.2	4.72E-14	19.376	96.7	16756	387.36	0.88
H	1250	2.0	99.5	9.92E-15	20.569	8.3	1358	408.70	2.91
Total gas			98.8	4.95E-13	17.959	138.9	1787	361.69	
	No age plateau								


K02-9-19K
White mica
Apparent Age (Ma)
600
500
400
300
200
100
0
100
$^{39}Ar_K$ Released (%)


K02-9-19K
A
B
C
N
D
E-M
.003
.002
.001
0
$^{36}Ar/^{40}Ar$
Isochron age = 339.4 ± 28.4 Ma
$(^{40}Ar/^{36}Ar)_i$ = 1125.5 ± 2064.1
MSWD = 0.018
Points ABCN deleted
0
.01
.02
.03
.04
.05
.06
$^{39}Ar/^{40}Ar$

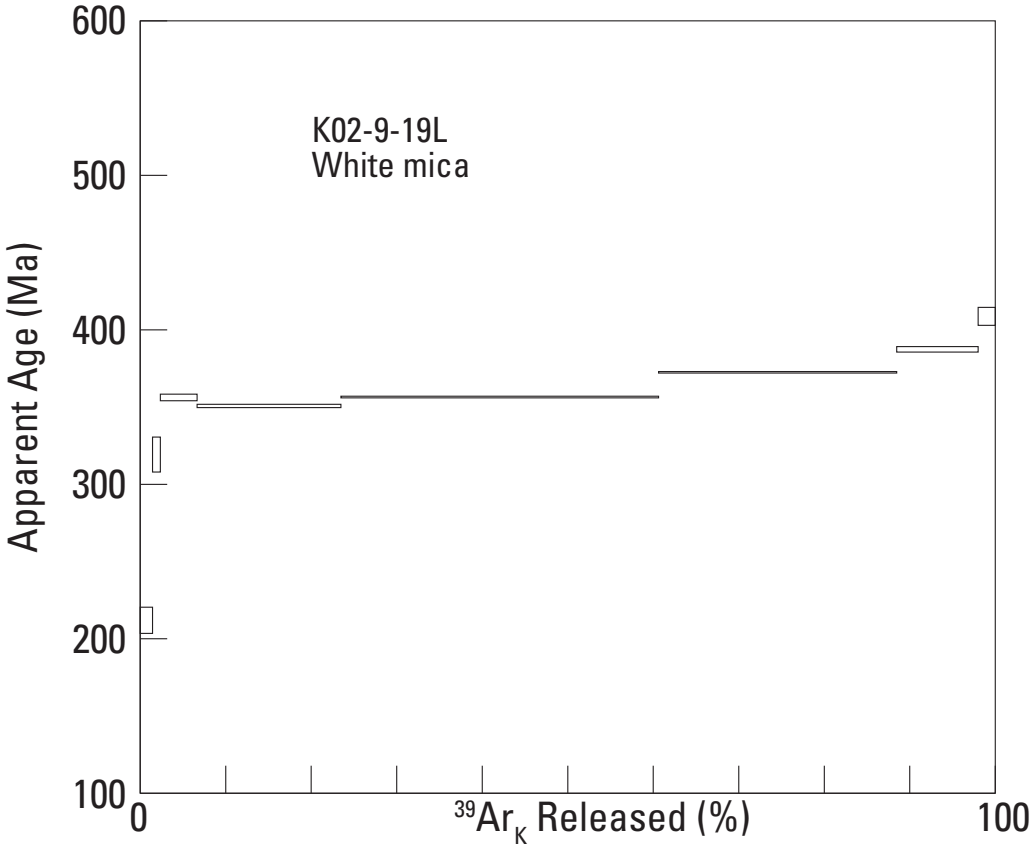
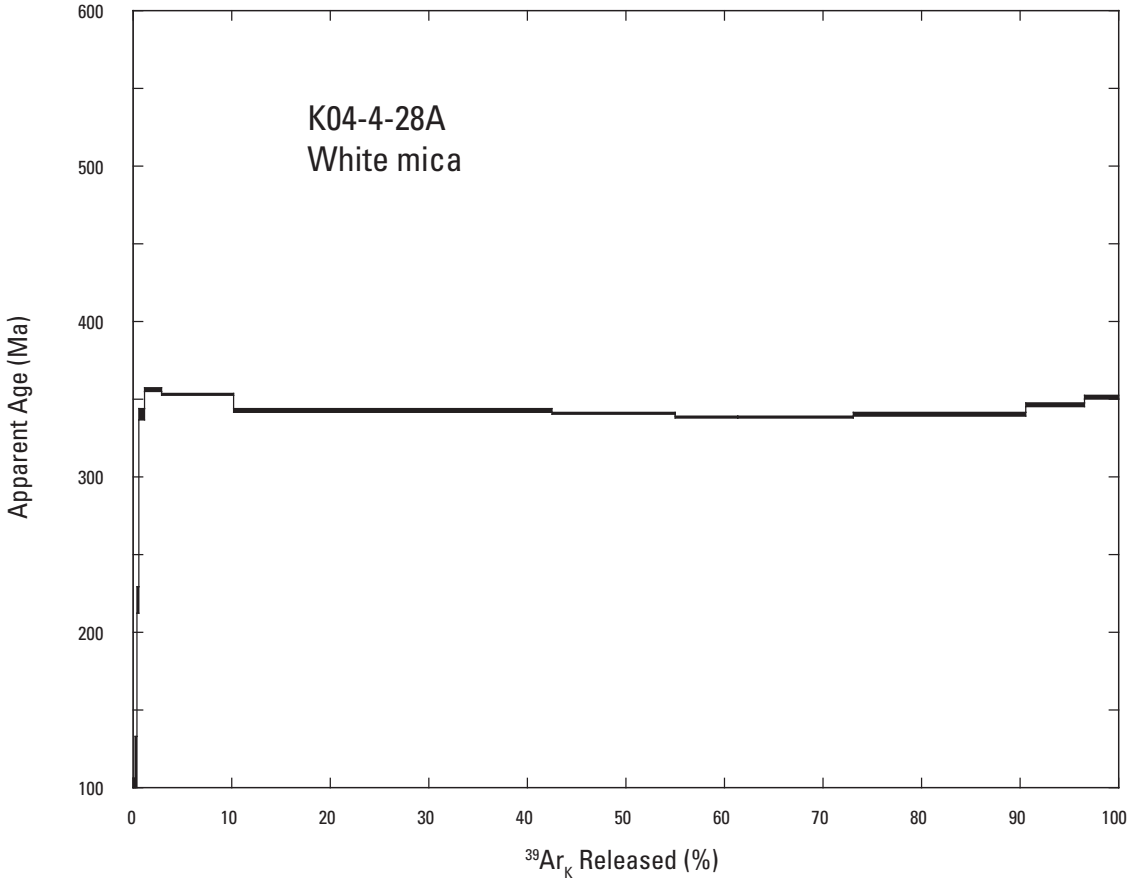

K02-9-19L
White mica
Apparent Age (Ma)
600
500
400
300
200
100
0
100
$^{39}Ar_K$ Released (%)

Table 2. $^{40}Ar/^{39}Ar$ analytical data.-- Continued

Step	Temperature (°C)	^{39}Ar (% of total	Radiogenic yield (%)	$^{39}Ar_k$ (moles)	$^{40}Ar^*/^{39}Ar_k$	Apparent K/Ca	Apparent K/Cl	Apparent age (Ma)	Error (Ma)
K04-4-28A M1				*J=.009487*	*±0.5%*	*wt.=0.00128 g*		222KD43	
A	650	0.3	9.8	1.96E-16	5.098	2.5	3	85.21	10.22
B	750	0.1	26.5	7.52E-17	6.420	1.4	3	106.66	13.02
C	850	0.2	61.8	1.58E-16	13.706	2.2	2	220.53	4.09
D	950	0.5	90.9	3.70E-16	21.865	4.2	2	340.07	1.75
E	1050	1.8	97.9	1.32E-15	23.001	23.7	5	356.10	0.67
F	1100	7.2	99.0	5.24E-15	22.758	147.3	50	352.67	0.30
G	1150	32.3	99.3	2.36E-14	22.046	258.3	108	342.63	0.47
H	1200	12.5	99.8	9.11E-15	21.943	216.0	50	341.17	0.23
I	1250	6.4	99.5	4.66E-15	21.771	82.6	21	338.72	0.32
J	1300	11.7	99.5	8.52E-15	21.790	167.8	3	339.00	0.31
K	1350	17.4	98.9	1.27E-14	21.874	170.1	3	340.19	0.50
L	1450	6.0	99.6	4.39E-15	22.309	56.9	19	346.34	0.39
M	1650	3.5	99.1	2.53E-15	22.669	43.1	11	351.43	0.46
Total gas								341.70	
	No age plateau								
K04-7-14B				*J=.009524*	*±0.5%*	*wt.=0.00108 g*		304KD43	
B	800	0.3	4.6	2.33E-16	3.572	4.3	3	60.36	12.43
C	900	0.8	30.9	6.09E-16	6.852	4.5	3	114.05	2.87
D	950	0.8	89.0	5.65E-16	20.180	5.4	5	317.15	1.44
E	1000	0.9	95.7	6.98E-16	25.556	12.6	6	393.01	1.09
F	1050	1.9	97.4	1.44E-15	26.149	24.0	8	401.18	0.77
G	1100	3.3	97.8	2.48E-15	24.437	51.5	16	377.49	0.49
H	1150	23.6	97.5	1.76E-14	22.088	115.1	74	344.44	0.34
I	1200	19.5	98.8	1.46E-14	21.907	257.1	77	341.87	0.35
J	1250	8.0	98.8	6.02E-15	22.085	83.8	33	344.40	0.25
K	1300	6.4	97.2	4.82E-15	22.443	65.5	24	349.47	0.34
L	1400	26.5	98.5	1.98E-14	21.756	74.7	3	339.72	0.29
M	1650	7.9	99.2	5.93E-15	21.948	14.1	20	342.45	0.32
Total gas								342.70	
	No age plateau								


K04-4-28A
White mica
Apparent Age (Ma)
600
500
400
300
200
100
0
10
20
30
40
50
60
70
80
90
100
$^{39}Ar_K$ Released (%)

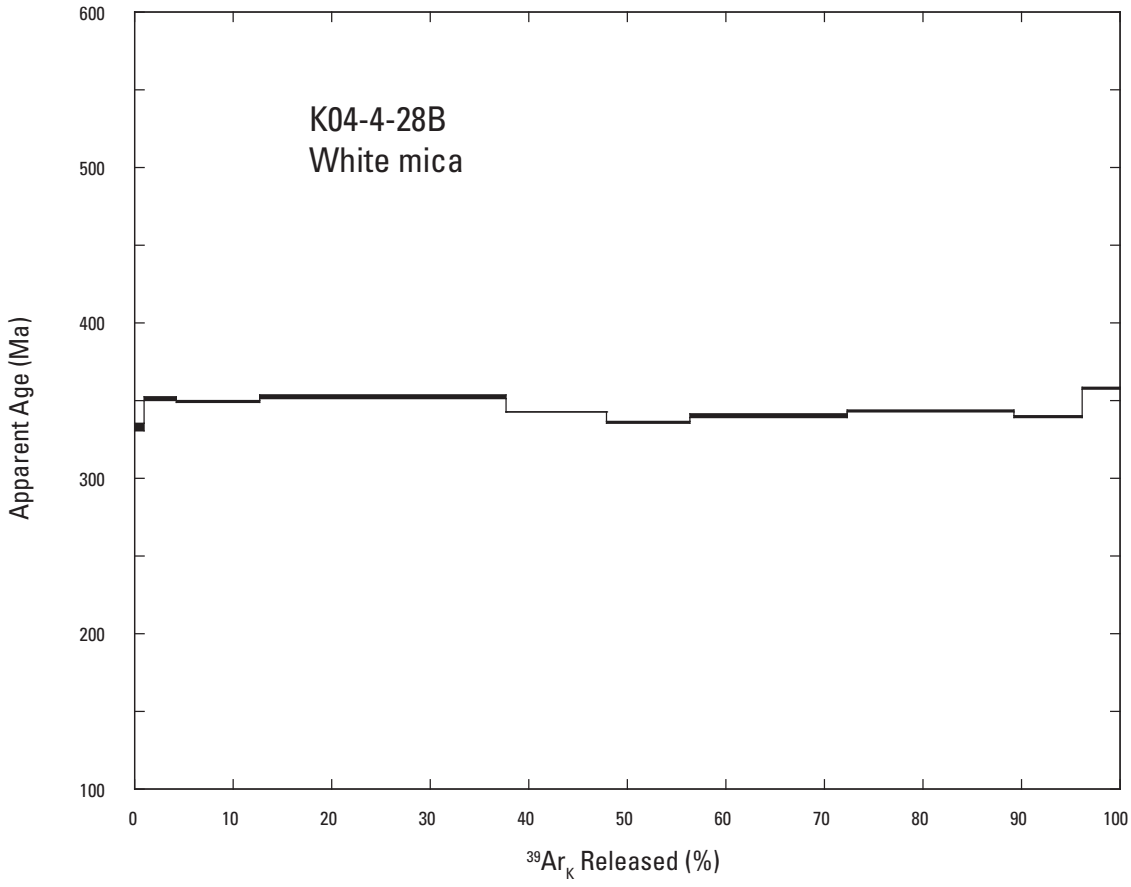
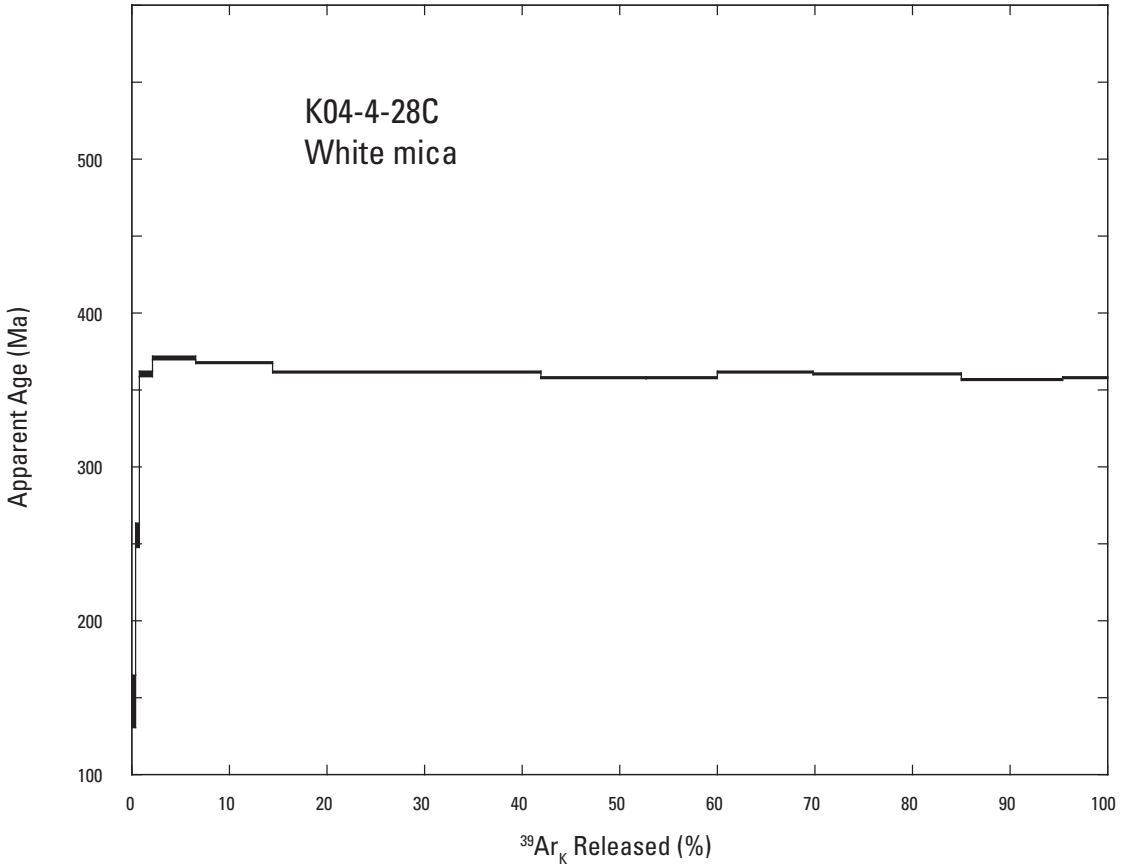

K04-4-28B
White mica
Apparent Age (Ma)
600
500
400
300
200
100
0
10
20
30
40
50
60
70
80
90
100
$^{39}Ar_K$ Released (%)

Table 2. $^{40}Ar/^{39}Ar$ analytical data.-- Continued

Step	Temperature (°C)	^{39}Ar [% of total	Radiogenic yield (%)	$^{39}Ar_k$ (moles)	$^{40}Ar^*/^{39}Ar_k$	Apparent K/Ca	Apparent K/Cl	Apparent age (Ma)	Error (Ma)
K04-4-28C M3				*J=.009502*	*±0.5%*	*wt.=0.00110 g*		224KD43	
B	750	0.3	11.3	2.64E-16	8.982	2.7	3	147.75	8.59
C	850	0.4	50.7	3.22E-16	16.015	3.3	3	255.54	3.72
D	950	1.4	90.3	1.10E-15	23.251	11.2	6	360.12	1.03
E	1050	4.4	96.0	3.51E-15	23.985	68.3	16	370.40	0.47
F	1100	7.9	95.0	6.34E-15	23.770	166.4	51	367.40	0.38
G	1150	27.5	97.3	2.21E-14	23.350	223.7	93	361.50	0.37
H	1200	10.9	98.3	8.78E-15	23.117	190.1	58	358.24	0.32
I	1250	7.3	97.1	5.86E-15	23.108	89.5	35	358.11	0.37
J	1300	9.8	97.1	7.83E-15	23.367	160.8	2	361.74	0.34
K	1350	15.2	98.7	1.22E-14	23.239	276.2	4	359.94	0.29
L	1450	10.3	99.3	8.24E-15	23.020	271.0	40	356.87	0.27
M	1650	4.7	98.8	3.75E-15	23.086	163.9	25	357.80	0.41
Total gas								359.80	
	No age plateau								
K-04-4-28D M4				*J=.009519*	*±0.5%*	*wt.=0.00112 g*		226KD43	
C	850	0.5	50.3	3.51E-16	13.727	7.1	6	221.56	4.41
D	950	2.3	88.4	1.53E-15	22.228	13.3	7	346.26	0.95
E	1050	5.9	97.2	3.96E-15	23.302	68.5	16	361.42	0.44
F	1100	23.1	97.9	1.55E-14	21.858	358.4	90	341.00	0.42
G	1150	25.3	99.1	1.70E-14	21.611	420.2	85	337.50	0.40
H	1200	9.2	99.4	6.15E-15	21.831	97.8	40	340.63	0.29
I	1250	7.0	98.9	4.70E-15	21.749	81.0	24	339.46	0.36
J	1300	10.1	98.9	6.76E-15	21.609	155.5	1	337.47	0.32
K	1350	14.4	99.6	9.65E-15	21.657	452.5	57	338.15	0.25
L	1450	1.8	98.8	1.23E-15	21.723	63.4	3	339.09	0.85
Total gas								340.00	
	No age plateau								


K04-4-28C
White mica
Apparent Age (Ma)
100
200
300
400
500
0
10
20
30
40
50
60
70
80
90
100
$^{39}Ar_K$ Released (%)

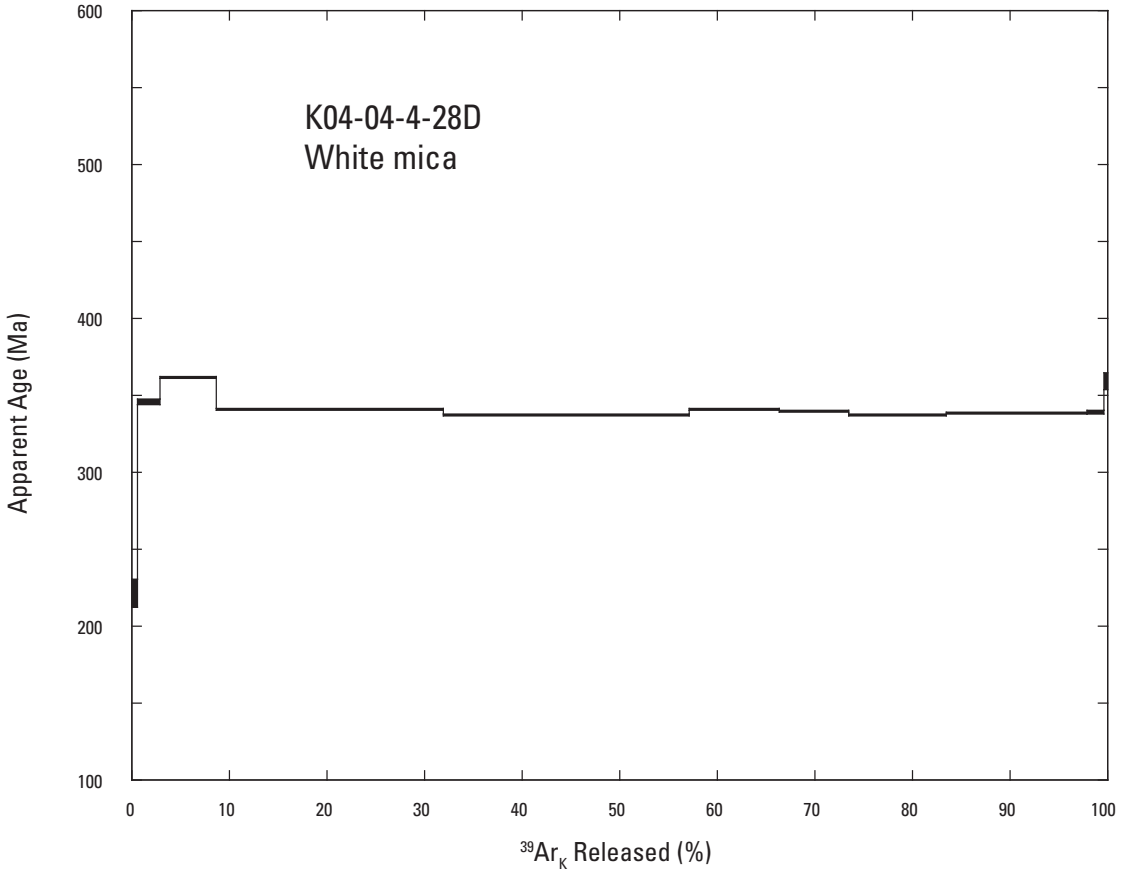
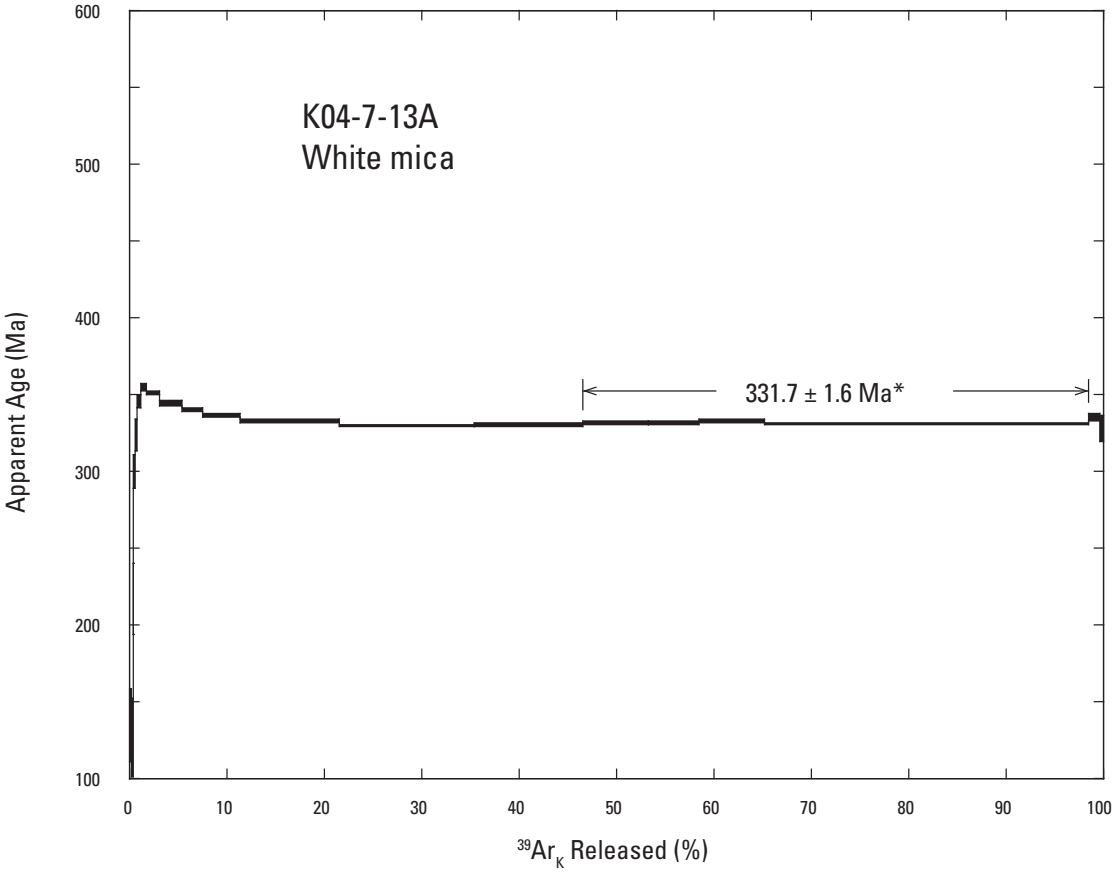

K04-04-4-28D
White mica
Apparent Age (Ma)
100
200
300
400
500
600
0
10
20
30
40
50
60
70
80
90
100
$^{39}Ar_K$ Released (%)

Table 2. $^{40}Ar/^{39}Ar$ analytical data.-- Continued

Step	Temperature (^oC)	^{39}Ar [% of total	Radiogenic yield (%)	$^{39}Ar_k$ (moles)	$^{40}Ar^*/^{39}Ar_k$	Apparent K/Ca	Apparent K/Cl	Apparent age (Ma)	Error (Ma)
K04-7-13A				*J= .009455*	*±0.5%*	*wt=0.00130 g*		197KD43	
C	750	0.2	7.5	1.68E-16	8.192	3.9	1	134.58	11.90
D	800	0.1	15.1	1.19E-16	7.693	3.4	1	126.68	12.60
E	850	0.1	35.0	1.07E-16	13.491	4.5	2	216.58	11.58
F	900	0.2	59.2	1.43E-16	19.112	4.3	4	299.67	5.46
G	950	0.1	73.7	1.23E-16	20.816	4.1	4	324.13	5.25
H	1000	0.3	86.4	3.14E-16	22.343	8.8	4	345.76	2.31
I	1050	0.7	93.8	6.72E-16	22.978	16.9	5	354.68	1.21
J	1100	1.3	95.9	1.23E-15	22.746	42.4	10	351.43	0.79
K	1150	2.2	97.2	2.04E-15	22.279	60.2	19	344.86	0.79
L	1175	2.2	96.5	2.00E-15	21.947	92.3	35	340.18	0.77
M	1200	3.8	94.5	3.52E-15	21.666	142.5	58	336.20	0.70
N	1225	10.2	96.7	9.39E-15	21.432	239.2	99	332.89	0.34
O	1250	13.8	98.6	1.27E-14	21.240	220.3	103	330.16	0.41
P	1300	11.1	99.0	1.02E-14	21.284	97.9	72	330.78	0.54
Q	1350	6.7	98.0	6.17E-15	21.370	58.9	43	332.01	0.57
R	1400	5.2	97.3	4.78E-15	21.320	85.6	35	331.30	0.63
S	1450	6.8	97.9	6.23E-15	21.426	102.4	35	332.80	0.64
T	1500	33.2	98.7	3.06E-14	21.298	160.8	5	330.98	0.55
U	1550	1.2	92.3	1.13E-15	21.615	112.6	2	335.48	1.36
V	1650	0.4	73.8	3.33E-16	21.114	17.1	1	328.37	4.39
Total gas								331.70	
	51.9 % of gas released on plateau in steps 1350^{0}C through 1500^{0}C						Plateau age =	331.70	1.60
K04-7-13B				*J=.009452*	*±0.5%*	*wt.=0.00125 g*		199KD43	
A	700	0.5	13.1	3.69E-16	6.120	6.1	9	101.45	6.01
B	800	0.3	49.3	2.18E-16	14.342	5.3	6	229.35	5.34
C	900	1.0	85.1	6.91E-16	19.307	6.5	6	302.41	1.25
D	1000	2.2	97.2	1.57E-15	23.525	20.5	7	362.23	0.73
E	1050	3.0	98.8	2.16E-15	23.827	41.2	10	366.44	1.02
F	1100	6.2	99.3	4.52E-15	24.239	63.2	23	372.15	0.47
G	1150	31.4	99.3	2.27E-14	24.628	118.1	71	377.54	0.37
H	1175	8.6	99.7	6.26E-15	23.186	93.3	39	357.50	0.55
I	1200	6.0	99.5	4.38E-15	23.160	62.6	30	357.13	0.43
J	1250	6.5	99.6	4.69E-15	23.358	34.8	29	359.90	0.40
K	1300	10.6	99.4	7.66E-15	23.361	36.1	1	359.94	0.63
L	1325	13.1	99.8	9.46E-15	23.958	53.8	91	368.25	0.33
M	1350	7.9	99.8	5.76E-15	24.913	41.8	50	381.49	0.32
N	1450	2.6	99.2	1.87E-15	26.139	6.7	19	398.32	0.61
O	1550	0.2	94.8	1.75E-16	28.931	4.6	1	436.11	3.66
Total gas								367.90	
	No age plateau								


K04-7-13A
White mica
331.7 ± 1.6 Ma*
Apparent Age (Ma)
$^{39}Ar_K$ Released (%)
600
500
400
300
200
100
0
10
20
30
40
50
60
70
80
90
100

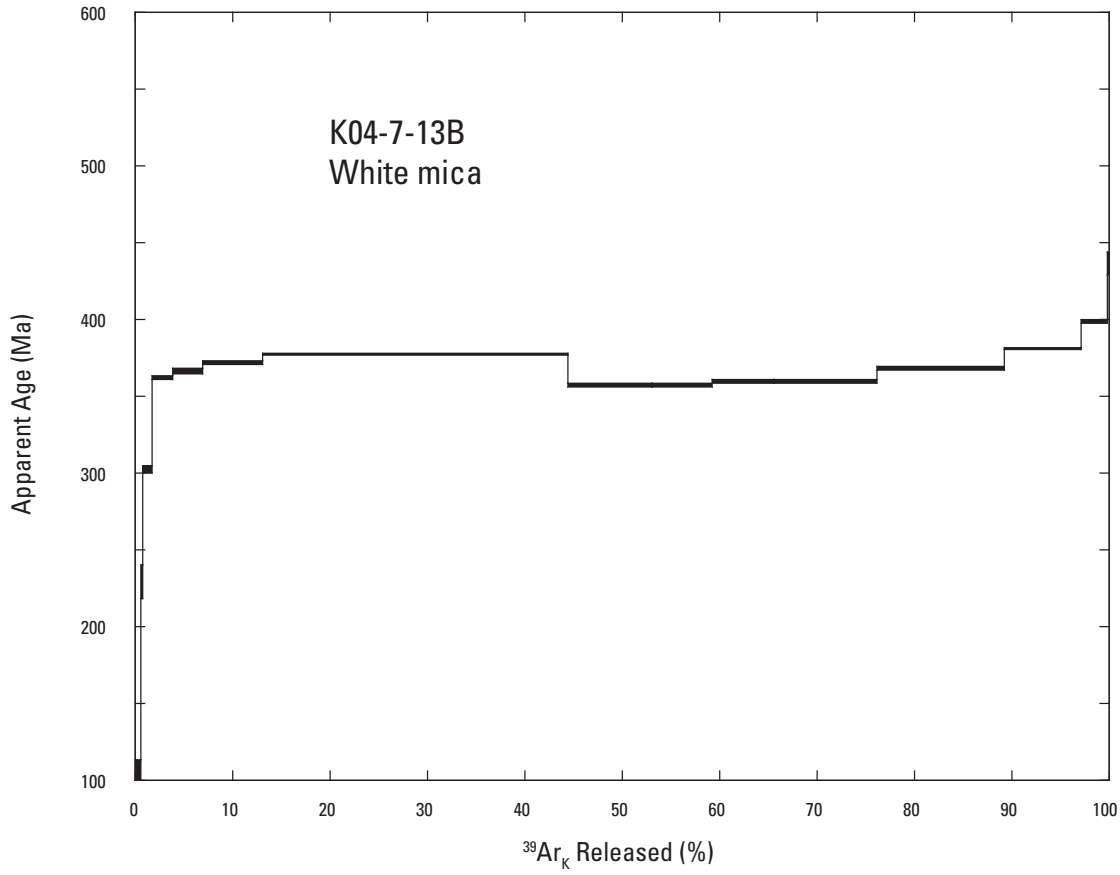
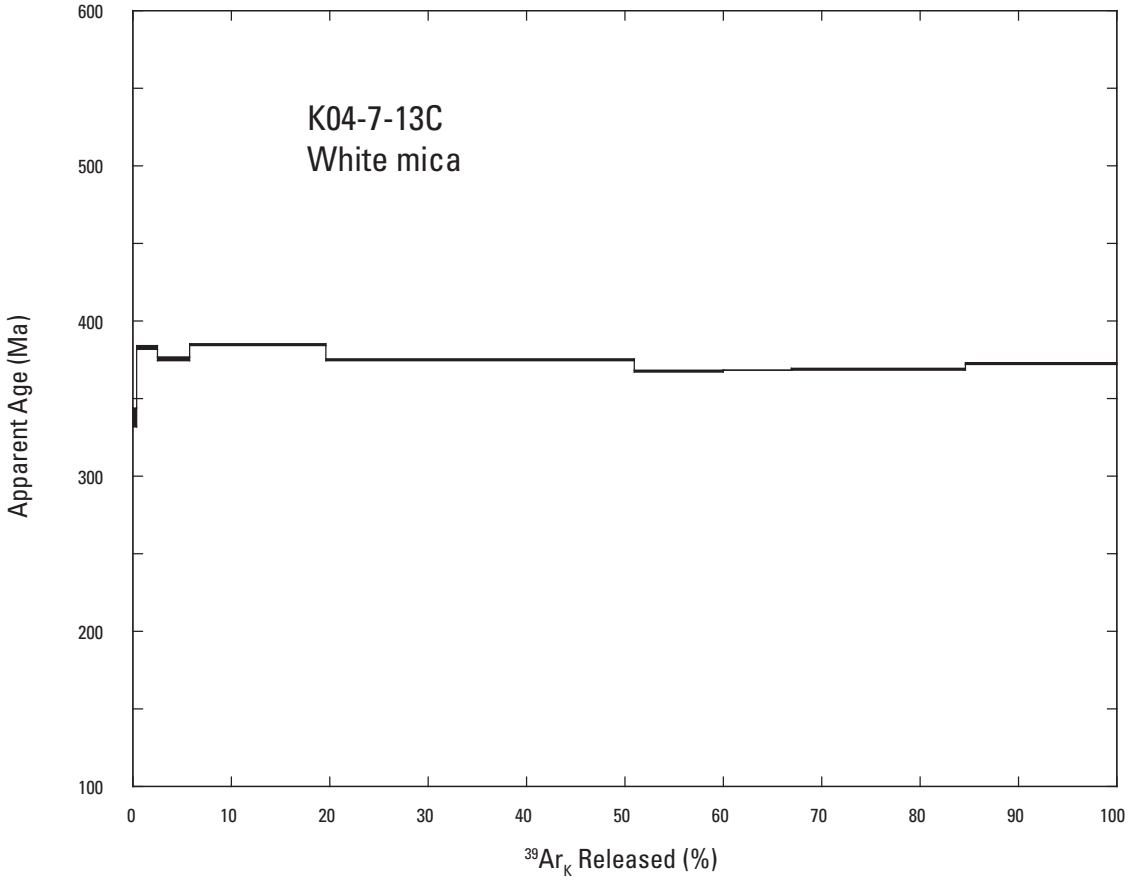

K04-7-13B
White mica
Apparent Age (Ma)
$^{39}Ar_K$ Released (%)
600
500
400
300
200
100
0
10
20
30
40
50
60
70
80
90
100

Table 2. $^{40}Ar/^{39}Ar$ analytical data.-- Continued

Step	Temperature (°C)	^{39}Ar [% of total	Radiogenic yield (%)	$^{39}Ar_k$ (moles)	$^{40}Ar^*/^{39}Ar_k$	Apparent K/Ca	Apparent K/Cl	Apparent age (Ma)	Error (Ma)
K04-7-13C				*J=.009224*	*±0.5%*	*wt.=0.00102g*		201KD43	
C	900	0.4	86.4	2.34E-16	21.626	5.3	4	337.70	3.16
D	1000	2.2	96.7	1.44E-15	24.830	20.5	6	382.76	0.72
E	1050	3.2	98.7	2.05E-15	24.323	60.2	17	375.71	0.57
F	1100	13.9	99.0	9.04E-15	24.963	129.7	76	384.61	0.22
G	1150	31.3	99.2	2.03E-14	24.236	222.7	89	374.50	0.33
H	1200	9.1	99.6	5.93E-15	23.734	51.9	43	367.48	0.34
I	1250	6.9	99.3	4.48E-15	23.794	70.5	25	368.32	0.29
J	1300	17.6	99.4	1.14E-14	23.851	116.8	2	369.12	0.28
K	1350	15.4	99.8	9.99E-15	24.097	154.6	85	372.56	0.28
Total gas								373.70	
	No age plateau								
K04-7-13D				*J=.009201*	*±0.5%*	*wt.=0.00100 g*		203KD43	
A	700	0.3	4.5	1.25E-16	13.353	5.1	5	209.05	35.84
B	800	1.8	21.8	7.69E-16	13.729	6.9	11	214.61	2.70
C	900	2.2	85.3	9.48E-16	21.936	10.4	10	331.68	10.62
D	1000	3.9	97.2	1.70E-15	28.244	34.6	9	416.76	7.79
E	1050	3.9	97.7	1.69E-15	23.050	81.7	17	347.00	9.13
F	1100	6.4	98.3	2.81E-15	23.387	254.5	33	351.60	6.50
G	1150	22.6	98.8	9.94E-15	21.719	219.8	68	328.68	12.08
H	1175	8.8	98.8	3.85E-15	21.002	90.3	53	318.73	9.87
I	1200	6.5	98.9	2.85E-15	21.571	142.5	38	326.62	9.32
J	1250	6.4	98.8	2.82E-15	21.844	104.3	30	330.40	9.84
K	1300	11.2	98.6	4.93E-15	25.309	122.4	2	377.67	6.65
L	1400	22.6	98.4	9.92E-15	21.556	***	5	326.43	8.48
M	1650	3.6	98.0	1.58E-15	26.148	78.3	6	388.93	6.24
Total gas								339.00	
	No age plateau								


K04-7-13C
White mica
Apparent Age (Ma)
600
500
400
300
200
100
0
10
20
30
40
50
60
70
80
90
100
$^{39}Ar_K$ Released (%)

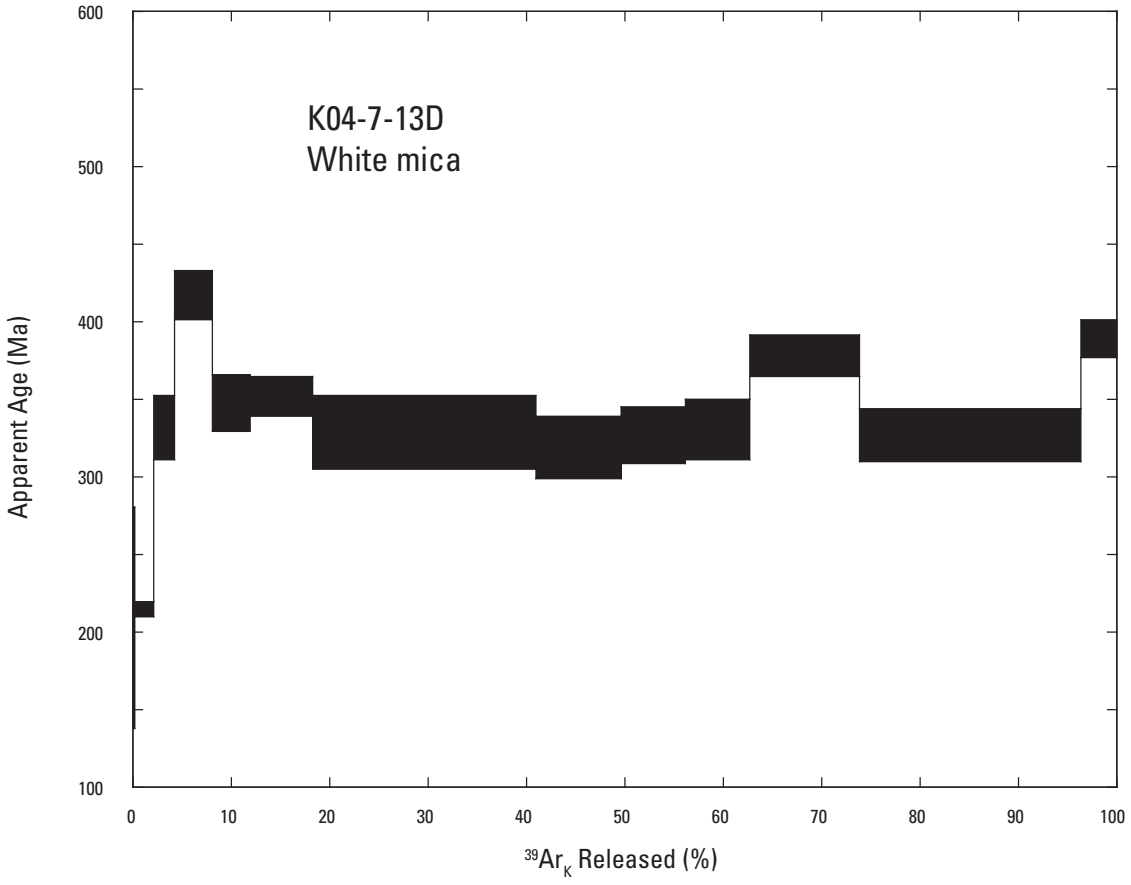
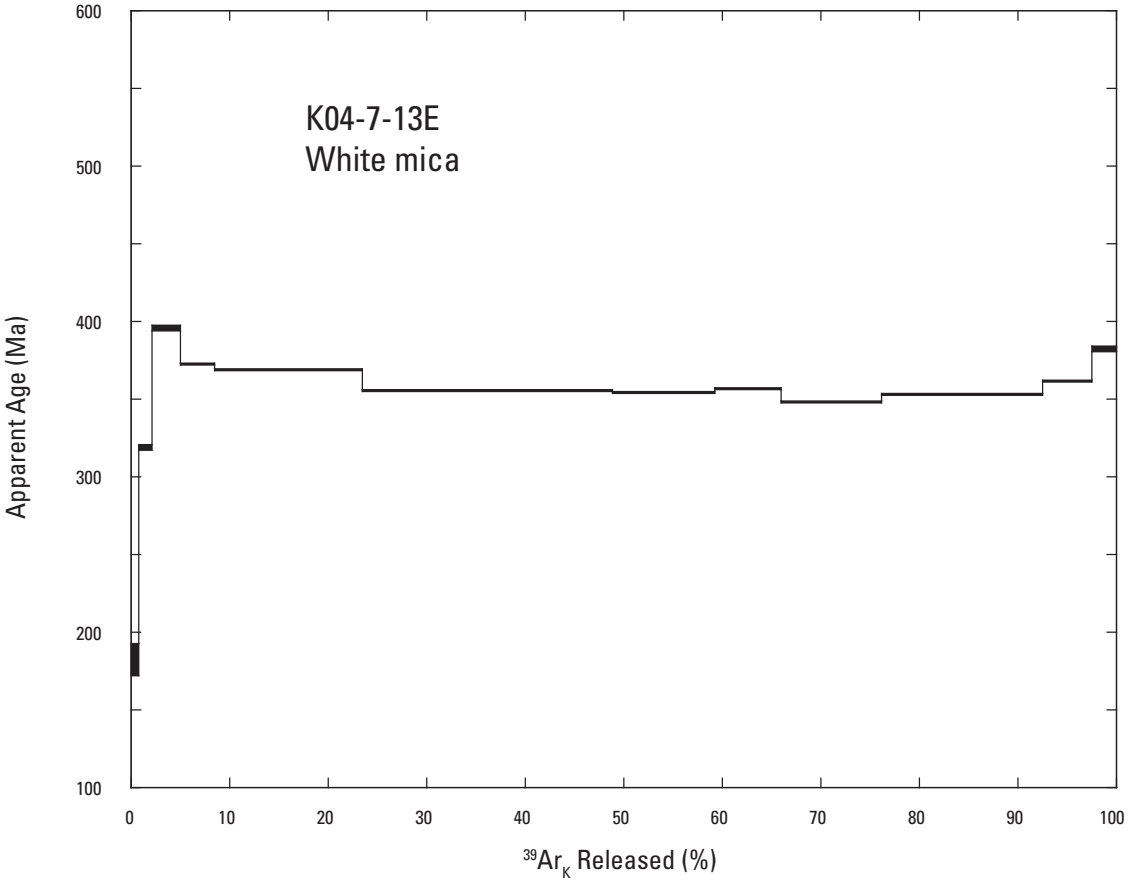

K04-7-13D
White mica
Apparent Age (Ma)
600
500
400
300
200
100
0
10
20
30
40
50
60
70
80
90
100
$^{39}Ar_K$ Released (%)

Table 2. $^{40}Ar/^{39}Ar$ analytical data.-- Continued

Step	Temperature (^oC)	^{39}Ar (% of total	Radiogenic yield (%)	$^{39}Ar_k$ (moles)	$^{40}Ar^*/^{39}Ar_k$	Apparent K/Ca	Apparent K/Cl	Apparent age (Ma)	Error (Ma)
K04-7-13E				*J=.009472*	*±0.5%*	*wt.=.00107 g*		205KD43	
B	800	0.8	16.6	5.58E-16	11.230	5.9	3	182.36	5.00
C	900	1.3	75.4	8.88E-16	20.411	8.0	5	318.86	1.07
D	1000	2.8	96.5	1.85E-15	25.904	33.5	7	395.86	0.70
E	1050	3.5	98.7	2.30E-15	24.200	219.3	18	372.33	0.48
F	1100	15.0	99.3	9.91E-15	23.963	243.3	74	369.03	0.25
G	1150	25.4	99.2	1.68E-14	22.991	232.0	73	355.45	0.38
H	1200	10.4	99.5	6.85E-15	22.874	211.0	41	353.81	0.25
I	1250	6.7	99.2	4.44E-15	23.056	109.5	22	356.35	0.38
J	1300	10.2	99.0	6.76E-15	22.435	130.9	1	347.62	0.31
K	1350	16.4	99.7	1.08E-14	22.813	232.6	18	352.94	0.24
L	1400	5.0	99.4	3.33E-15	23.425	147.7	59	361.53	0.40
M	1650	2.5	97.9	1.66E-15	24.927	123.9	11	382.41	0.70
Total gas								357.00	
	No age plateau								
K04-7-13F				*J=.009477*	*±0.5%*	*wt.=0.00102 g*		207KD43	
B	700	0.5	0.4	3.18E-16	2.468	3.8	2	41.70	28.03
C	750	0.5	5.5	3.56E-16	6.058	6.0	1	100.70	8.19
D	800	0.4	15.1	2.87E-16	7.352	5.5	1	121.52	6.00
E	850	0.4	41.8	2.76E-16	14.478	8.0	6	231.96	5.61
F	900	0.6	69.1	3.88E-16	19.265	8.2	6	302.54	1.97
G	950	0.6	84.2	3.71E-16	22.268	17.3	6	345.44	2.01
H	1000	1.3	93.0	8.50E-16	23.402	30.5	5	361.38	1.27
I	1050	2.5	97.0	1.62E-15	23.664	92.8	11	365.04	0.59
J	1100	5.4	97.7	3.49E-15	23.271	133.0	30	359.53	0.47
K	1150	34.3	98.7	2.23E-14	22.334	344.8	103	346.37	0.40
L	1175	9.9	99.4	6.45E-15	22.121	287.4	51	343.36	0.44
M	1200	6.0	99.0	3.90E-15	22.075	212.8	27	342.71	0.39
N	1225	3.6	98.6	2.34E-15	22.211	85.6	16	344.64	0.49
O	1250	3.3	98.6	2.13E-15	22.208	115.3	16	344.59	0.89
P	1300	8.0	98.2	5.23E-15	22.048	82.4	1	342.32	0.40
Q	1350	15.4	99.5	1.00E-14	21.944	298.5	63	340.85	0.36
R	1400	4.9	99.4	3.19E-15	22.141	297.6	15	343.64	0.49
S	1450	2.2	99.1	1.44E-15	22.448	492.6	10	347.97	0.76
Total gas								341.50	
	85.5 % of gas released on plateau in steps 1150^{0}C through 1400^{0}C						Plateau age =	343.30	1.70


K04-7-13E
White mica
Apparent Age (Ma)
600
500
400
300
200
100
0
10
20
30
40
50
60
70
80
90
100
$^{39}Ar_K$ Released (%)

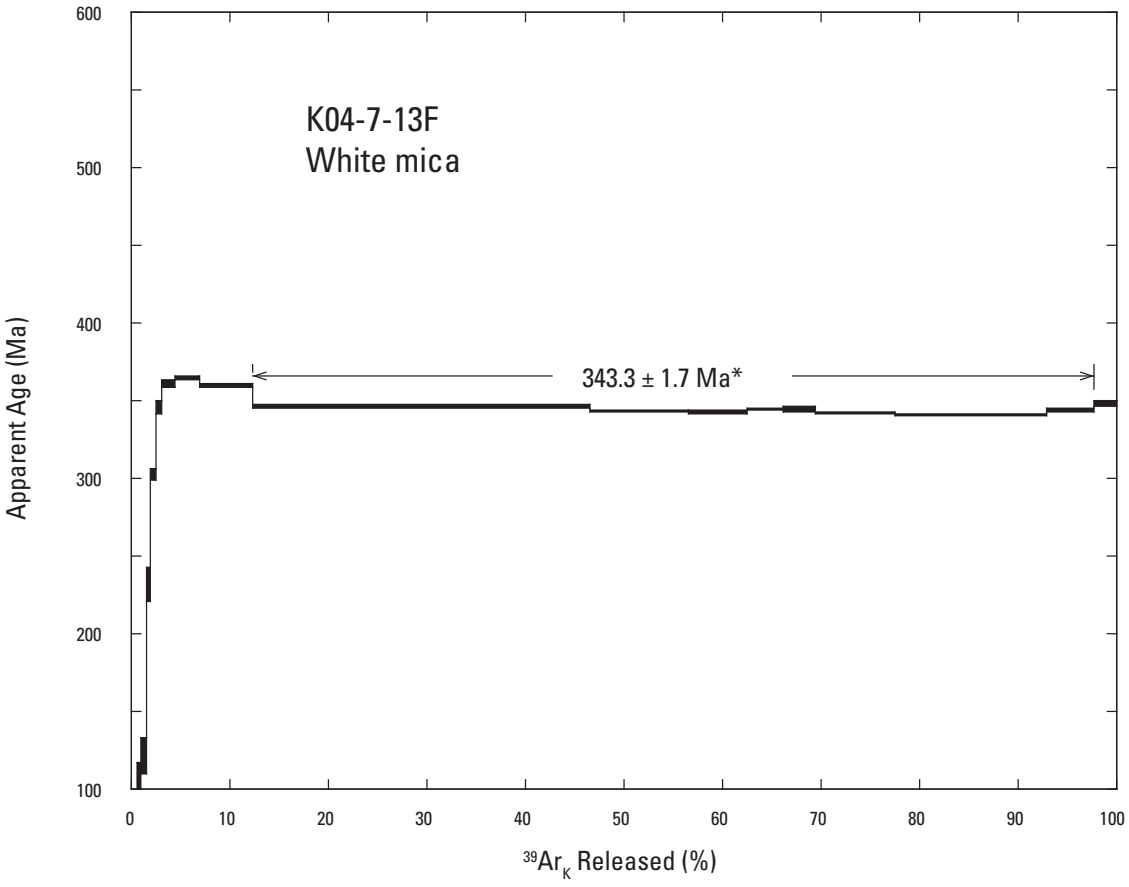
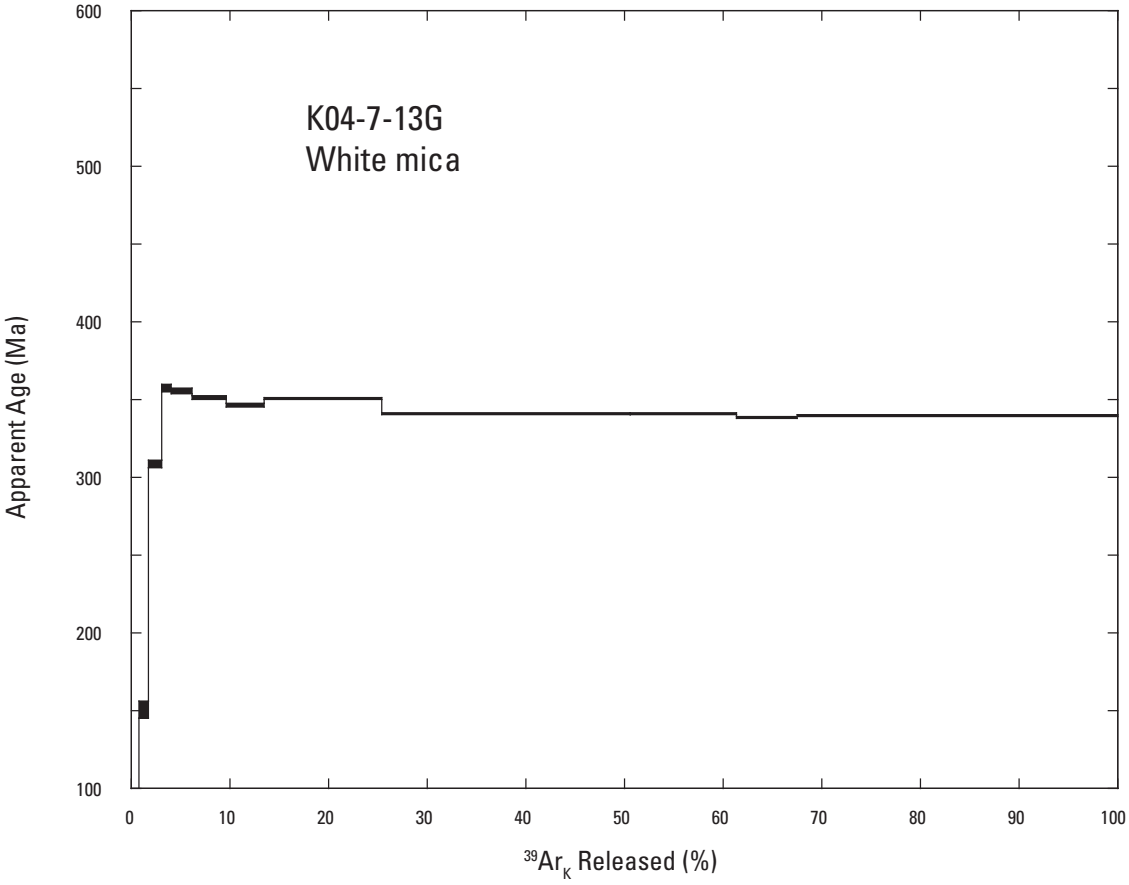

K04-7-13F
White mica
343.3 ± 1.7 Ma*
Apparent Age (Ma)
600
500
400
300
200
100
0
10
20
30
40
50
60
70
80
90
100
$^{39}Ar_K$ Released (%)

Table 2. $^{40}Ar/^{39}Ar$ analytical data.-- Continued

Step	Temperature (°C)	^{39}Ar [% of total	Radiogenic yield (%)	$^{39}Ar_k$ (moles)	$^{40}Ar^*/^{39}Ar_k$	Apparent K/Ca	Apparent K/Cl	Apparent age (Ma)	Error (Ma)
K04-7-13G				*J=.009472*	*±0.5%*	*wt.=0.00098 g*		209KD43	
B	800	0.8	8.3	4.76E-16	4.037	4.1	3	67.70	6.26
C	900	0.9	38.1	5.11E-16	9.193	3.1	3	150.62	2.80
D	1000	1.3	85.0	7.47E-16	19.692	4.6	4	308.55	1.13
E	1050	1.0	94.7	5.71E-16	23.124	18.5	5	357.31	1.26
F	1100	2.0	96.9	1.14E-15	22.969	35.8	6	355.13	0.84
G	1150	3.6	97.7	2.04E-15	22.699	95.7	11	351.34	0.55
H	1175	3.7	97.8	2.10E-15	22.368	141.0	20	346.68	0.52
I	1200	11.9	98.7	6.77E-15	22.625	221.7	70	350.30	0.33
J	1250	25.3	98.8	1.44E-14	21.960	934.6	71	340.91	0.37
K	1300	10.8	99.3	6.15E-15	21.963	120.3	33	340.96	0.38
L	1350	6.0	98.4	3.39E-15	21.782	78.9	13	338.40	0.50
M	1650	32.6	98.1	1.85E-14	21.834	93.3	2	339.14	0.35
Total gas								338.20	
	No age plateau								
K04-7-13H				*J=.009479*	*±0.5%*	wt.=0.00100 g		*211KD43*	
A	700	1.0	21.9	4.24E-16	15.103	3.0	2	241.38	11.11
B	800	0.2	66.6	7.43E-17	18.545	8.1	4	292.15	15.10
C	900	0.9	88.1	3.99E-16	21.163	6.4	4	329.83	10.43
D	1000	3.6	94.7	1.55E-15	24.227	31.1	7	372.95	11.95
E	1050	2.5	96.9	1.08E-15	23.615	***	22	364.42	11.71
F	1100	16.2	97.7	6.95E-15	25.657	193.1	54	392.72	10.52
G	1125	20.7	99.7	8.87E-15	22.791	251.3	89	352.87	11.59
H	1150	9.9	99.1	4.25E-15	23.123	141.8	57	357.54	12.17
I	1175	5.7	98.3	2.43E-15	22.742	89.0	36	352.18	11.69
J	1200	3.9	98.8	1.66E-15	23.256	181.8	27	359.40	12.07
K	1250	4.4	98.7	1.88E-15	26.774	65.4	18	408.03	14.45
L	1300	6.4	98.8	2.73E-15	23.659	124.1	1	365.04	14.73
M	1350	14.0	99.1	6.01E-15	23.726	155.3	2	365.97	14.35
N	1400	10.7	99.5	4.57E-15	22.818	211.4	60	353.25	12.28
Total gas								365.00	
	No age plateau								


K04-7-13G
White mica
Apparent Age (Ma)
600
500
400
300
200
100
0
10
20
30
40
50
60
70
80
90
100
$^{39}Ar_K$ Released (%)

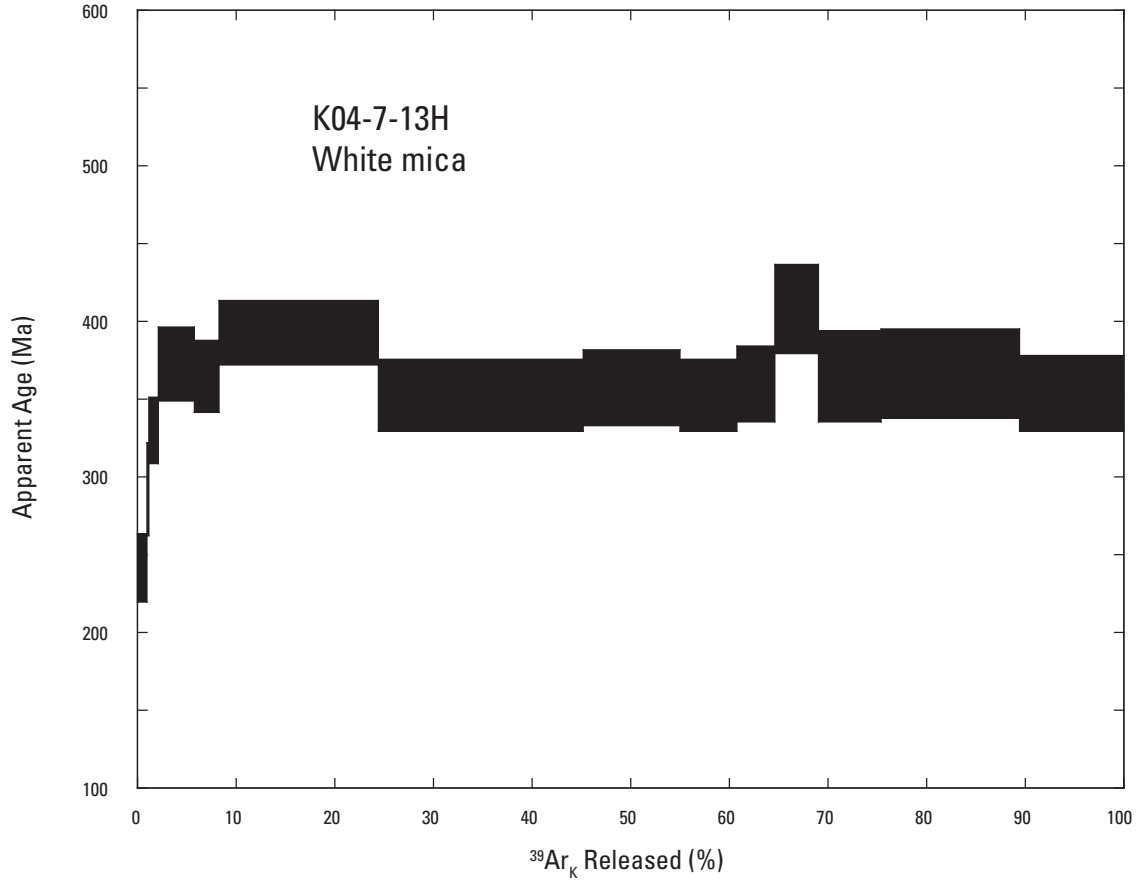
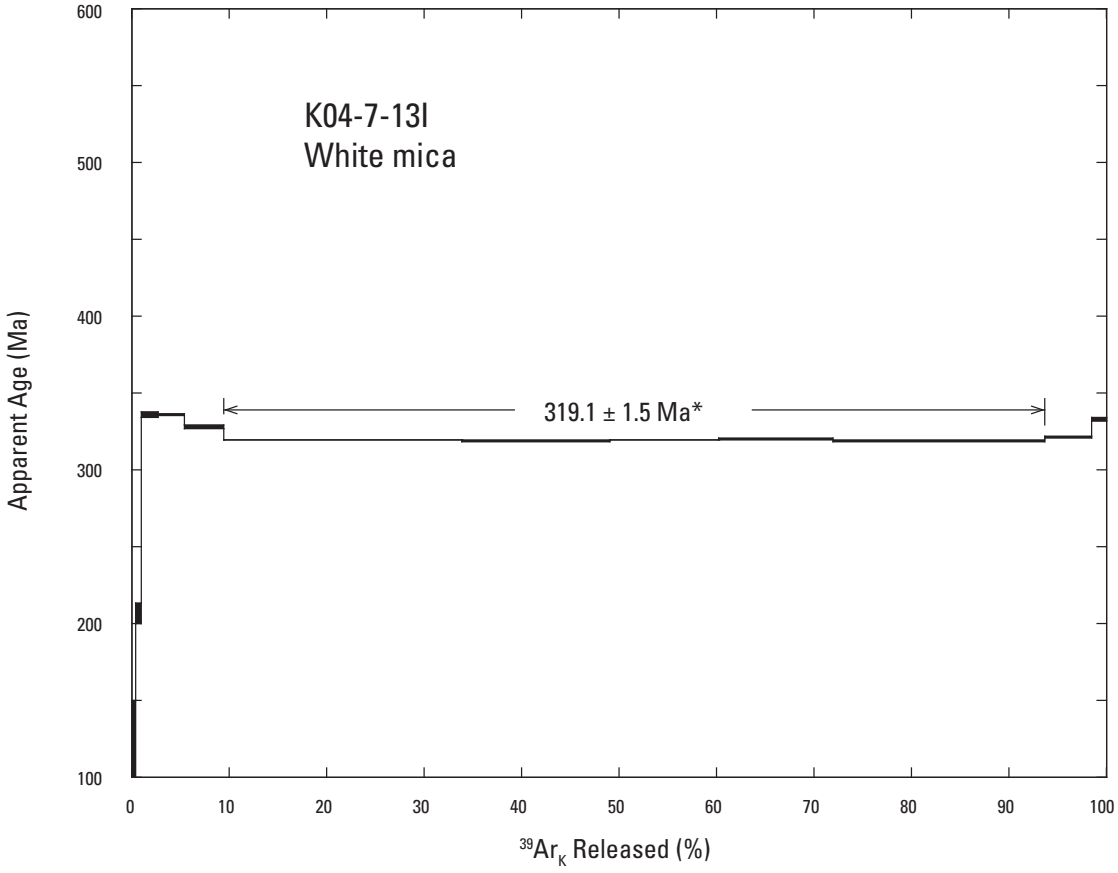

K04-7-13H
White mica
Apparent Age (Ma)
600
500
400
300
200
100
0
10
20
30
40
50
60
70
80
90
100
$^{39}Ar_K$ Released (%)

Table 2. $^{40}Ar/^{39}Ar$ analytical data.-- Continued

Step	Temperature (^oC)	^{39}Ar (% of total	Radiogenic yield (%)	$^{39}Ar_k$ (moles)	$^{40}Ar^*/^{39}Ar_k$	Apparent K/Ca	Apparent K/Cl	Apparent age (Ma)	Error (Ma)
K04-7-13I				*J=.009485*	*±0.5%*	*wt.=0.00109 g*		213KD43	
B	800	0.3	2.4	2.44E-16	7.467	2.7	2	123.46	13.41
C	900	0.6	29.5	4.29E-16	12.785	2.9	2	206.50	3.44
D	1000	1.9	93.5	1.39E-15	21.605	13.7	6	336.31	0.79
E	1050	2.6	99.0	1.90E-15	21.578	30.3	13	335.93	0.50
F	1100	4.1	98.8	3.04E-15	21.010	36.5	27	327.83	0.43
G	1150	24.4	98.5	1.80E-14	20.428	97.9	83	319.52	0.27
H	1200	15.1	99.8	1.12E-14	20.361	70.4	72	318.56	0.20
I	1250	11.2	99.7	8.32E-15	20.432	47.1	48	319.58	0.27
J	1300	11.8	99.5	8.75E-15	20.440	45.6	2	319.69	0.29
K	1350	21.6	98.6	1.60E-14	20.358	77.5	9	318.51	0.35
L	1400	4.8	99.9	3.52E-15	20.537	48.0	43	321.07	0.31
M	1650	1.6	97.9	1.19E-15	21.385	32.6	7	333.18	0.70
Total gas								319.30	
	84.2 % of gas released on plateau in steps 1150^0C through 1350^0C						Plateau age =	319.10	1.50
K04-7-13K				*J=.009488*	*±0.5%*	*wt.=0.00125 g*		219KD43	
B	800	1.0	4.5	7.94E-16	5.587	5.6	6	93.18	7.72
C	900	2.1	76.2	1.72E-15	17.478	8.5	10	276.81	0.73
D	1000	3.6	96.0	2.91E-15	21.900	37.3	14	340.59	0.45
E	1050	5.5	99.0	4.39E-15	22.369	104.7	24	347.23	0.33
F	1100	9.4	99.2	7.53E-15	22.057	128.4	54	342.81	0.25
G	1150	19.4	98.8	1.56E-14	22.240	193.4	71	345.41	0.39
H	1200	16.4	99.7	1.32E-14	21.897	177.3	68	340.55	0.33
I	1250	15.5	99.7	1.25E-14	21.904	99.9	57	340.65	0.21
J	1300	15.5	98.6	1.24E-14	22.228	104.6	2	345.24	0.44
K	1350	5.4	99.7	4.36E-15	22.429	36.6	4	348.07	0.30
L	1400	2.3	99.2	1.83E-15	22.544	7.5	37	349.69	0.53
M	1650	4.0	98.7	3.20E-15	23.296	18.8	21	360.27	0.38
Total gas								340.60	
	No age plateau								


K04-7-13I
White mica
319.1 ± 1.5 Ma*
Apparent Age (Ma)
600
500
400
300
200
100
0
10
20
30
40
50
60
70
80
90
100
39ArK Released (%)

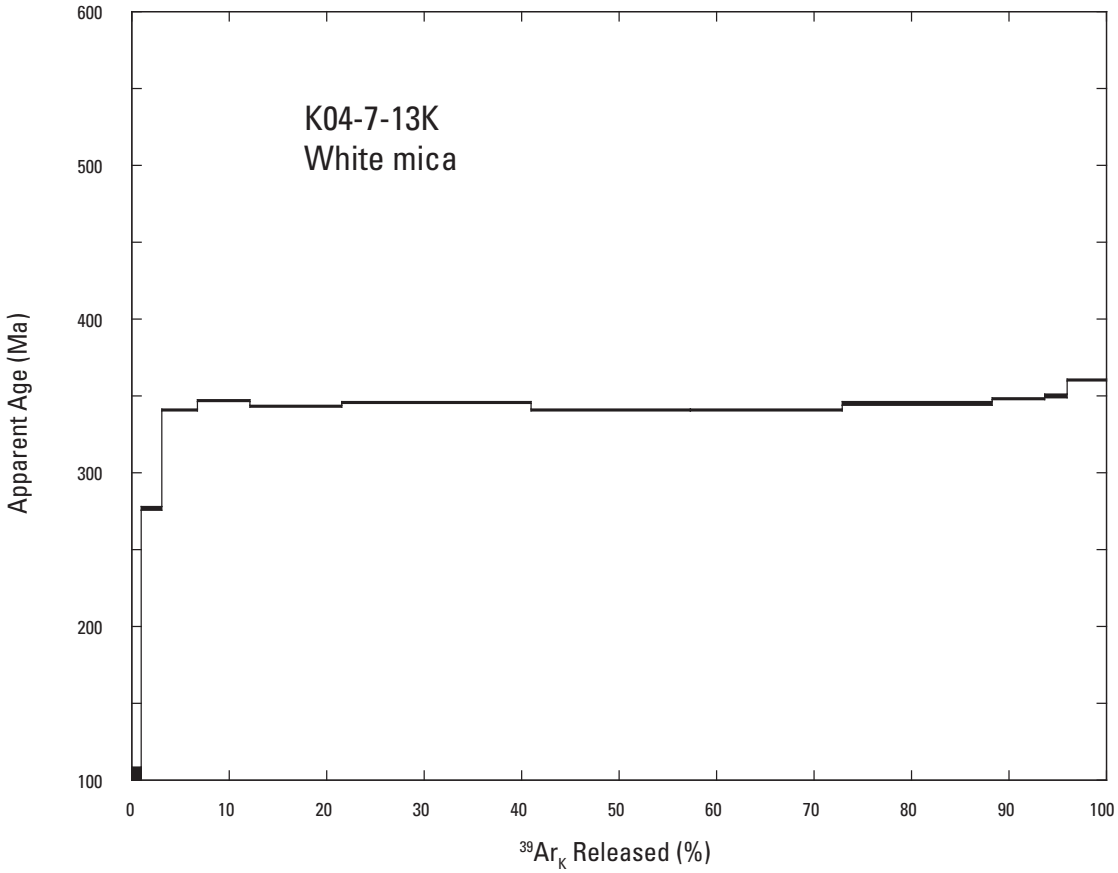
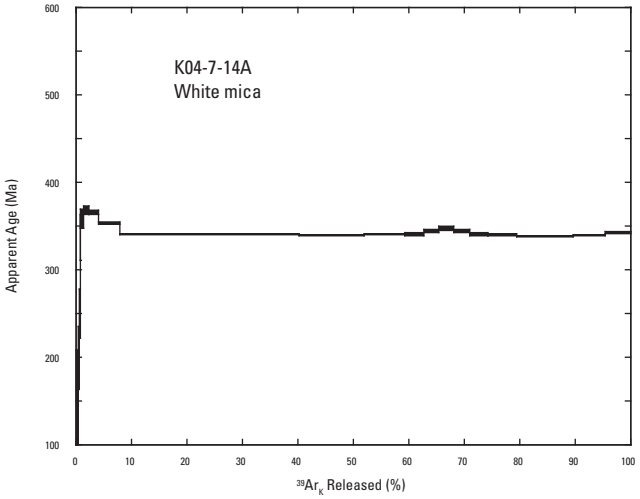
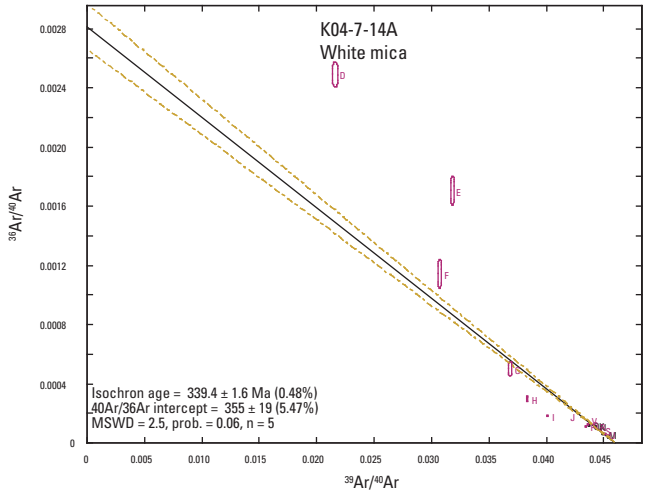

K04-7-13K
White mica
Apparent Age (Ma)
600
500
400
300
200
100
0
10
20
30
40
50
60
70
80
90
100
39ArK Released (%)

Table 2. $^{40}Ar/^{39}Ar$ analytical data.-- Continued

Step	Temperature (°C)	^{39}Ar (% of total	Radiogenic yield (%)	$^{39}Ar_k$ (moles)	$^{40}Ar^*/^{39}Ar_k$	Apparent K/Ca	Apparent K/Cl	Apparent age (Ma)	Error (Ma)
K04-7-14A				*J=.009524*	*±0.5%*	*wt.=0.00120 g*		298KD43	
B	700	0.2	3.2	1.33E-16	8.940	3.2	4	147.42	30.83
C	750	0.2	6.7	1.50E-16	8.697	1.7	4	143.56	24.07
D	800	0.2	26.5	1.12E-16	12.240	1.3	2	198.92	18.02
E	850	0.2	49.7	1.21E-16	15.590	2.4	3	249.75	13.91
F	900	0.2	66.3	1.17E-16	21.582	2.8	4	337.25	13.26
G	950	0.4	85.3	3.11E-16	23.098	5.1	4	358.72	5.62
H	1000	1.0	91.3	7.05E-16	23.768	11.5	6	368.14	2.25
I	1050	1.9	94.7	1.38E-15	23.569	29.9	10	365.35	1.21
J	1100	3.8	94.6	2.79E-15	22.759	50.2	22	353.94	0.73
K	1150	32.3	96.6	2.39E-14	21.861	106.6	107	341.22	0.35
L	1175	11.8	98.9	8.75E-15	21.769	89.4	81	339.90	0.38
M	1200	7.2	98.3	5.31E-15	21.844	68.4	55	340.97	0.41
N	1225	3.4	96.9	2.49E-15	21.843	35.8	32	340.95	0.73
O	1250	2.7	96.6	2.01E-15	22.063	24.1	24	344.08	0.96
P	1275	2.7	96.9	1.99E-15	22.277	55.1	25	347.12	1.21
Q	1300	2.9	96.5	2.12E-15	22.087	28.3	24	344.42	0.84
R	1325	3.3	96.7	2.43E-15	21.841	52.9	23	340.93	0.83
S	1350	5.2	97.5	3.85E-15	21.764	352.1	1	339.83	0.62
T	1400	10.1	98.6	7.40E-15	21.681	82.2	11	338.66	0.33
U	1450	5.7	98.2	4.20E-15	21.746	59.3	38	339.58	0.49
V	1550	4.7	95.5	3.44E-15	21.939	84.3	34	342.33	0.59
Total gas								341.20	
	No age plateau								
K04-7-14B				*J=.009524*	*±0.5%*	*wt.=0.00108 g*		304KD43	
B	800	0.3	4.6	2.33E-16	3.572	4.3	3	60.36	12.43
C	900	0.8	30.9	6.09E-16	6.852	4.5	3	114.05	2.87
D	950	0.8	89.0	5.65E-16	20.180	5.4	5	317.15	1.44
E	1000	0.9	95.7	6.98E-16	25.556	12.6	6	393.01	1.09
F	1050	1.9	97.4	1.44E-15	26.149	24.0	8	401.18	0.77
G	1100	3.3	97.8	2.48E-15	24.437	51.5	16	377.49	0.49
H	1150	23.6	97.5	1.76E-14	22.088	115.1	74	344.44	0.34
I	1200	19.5	98.8	1.46E-14	21.907	257.1	77	341.87	0.35
J	1250	8.0	98.8	6.02E-15	22.085	83.8	33	344.40	0.25
K	1300	6.4	97.2	4.82E-15	22.443	65.5	24	349.47	0.34
L	1400	26.5	98.5	1.98E-14	21.756	74.7	3	339.72	0.29
M	1650	7.9	99.2	5.93E-15	21.948	14.1	20	342.45	0.32
Total gas								342.70	
	No age plateau								


K04-7-14A
White mica
Apparent Age (Ma)
$^{39}Ar_K$ Released (%)


K04-7-14A
White mica
Isochron age = 339.4 ± 1.6 Ma (0.48%)
40Ar/36Ar intercept = 355 ± 19 (5.47%)
MSWD = 2.5, prob. = 0.06, n = 5
$^{36}Ar/^{40}Ar$
$^{39}Ar/^{40}Ar$

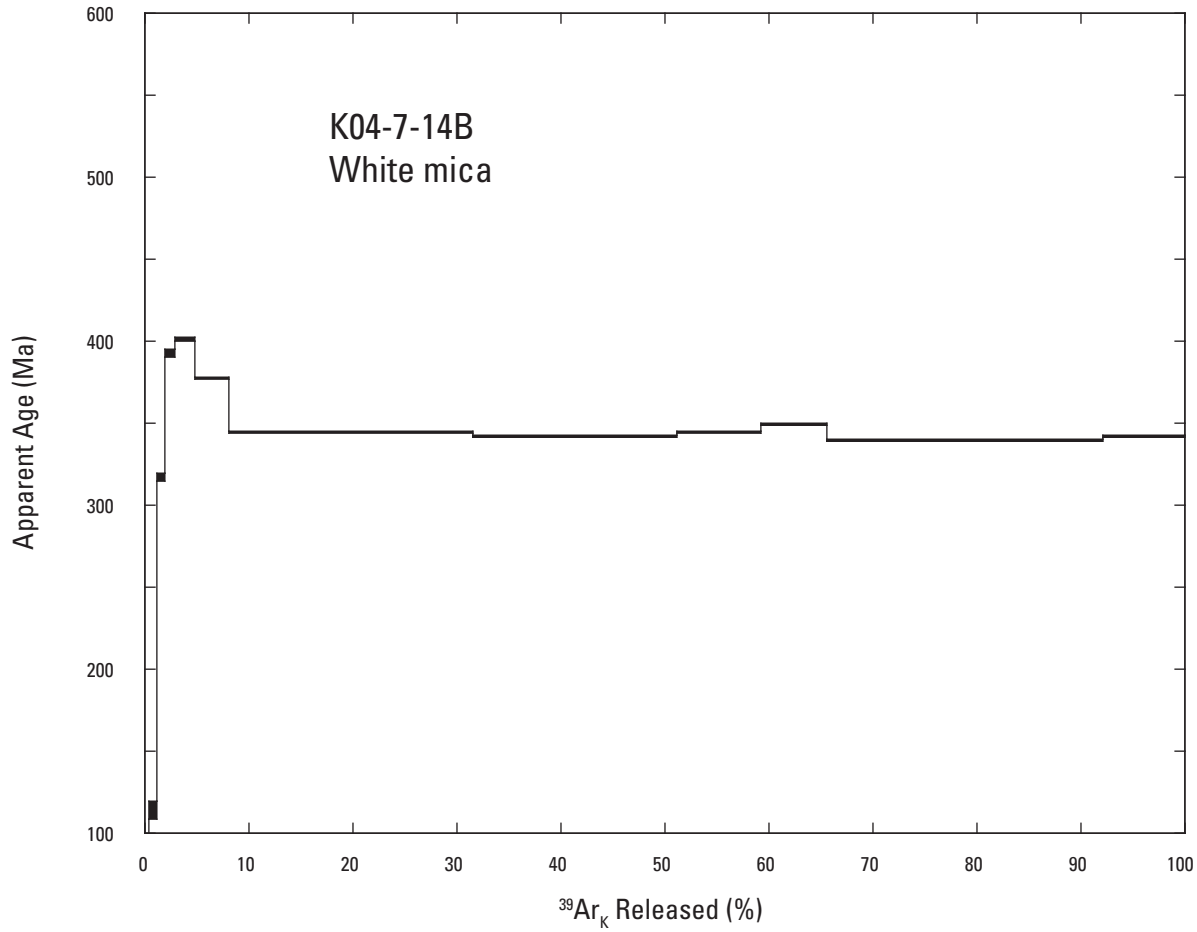
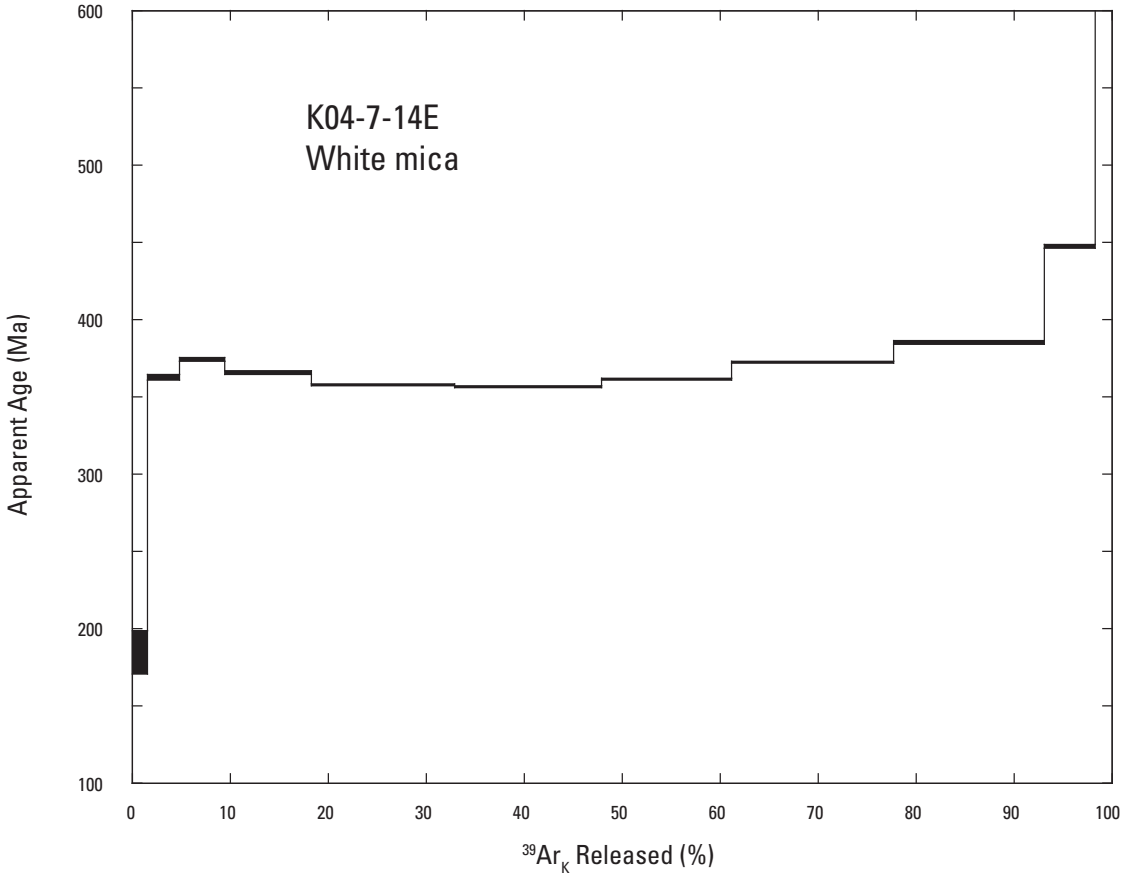

K04-7-14B
White mica
Apparent Age (Ma)
$^{39}Ar_K$ Released (%)

Table 2. $^{40}Ar/^{39}Ar$ analytical data.-- Continued

Step	Temperature (°C)	^{39}Ar [% of total	Radiogenic yield (%)	$^{39}Ar_k$ (moles)	$^{40}Ar^*/^{39}Ar_k$	Apparent K/Ca	Apparent K/Cl	Apparent age (Ma)	Error (Ma)
K04-7-14E				*J=.009524*	*±0.5%*	*wt.=0.00110 g*		314KD43	
B	800	1.5	18.0	3.98E-16	11.332	3.4	8	184.89	6.93
C	900	3.4	83.6	9.23E-16	23.397	3.8	9	362.93	1.09
D	950	4.5	98.4	1.23E-15	24.192	9.1	13	374.06	0.71
E	1000	8.9	99.7	2.44E-15	23.613	12.2	17	365.95	0.52
F	1050	14.7	99.6	4.01E-15	23.025	15.6	24	357.69	0.37
G	1100	14.9	99.3	4.06E-15	22.968	12.5	19	356.89	0.43
H	1150	13.4	99.2	3.66E-15	23.302	9.7	15	361.59	0.32
I	1200	16.5	99.5	4.52E-15	24.118	10.8	28	373.03	0.33
J	1250	15.4	99.6	4.20E-15	25.007	7.4	22	385.41	0.34
K	1300	5.2	98.4	1.43E-15	29.591	1.7	2	447.93	0.70
L	1400	0.8	94.7	2.14E-16	98.647	0.1	0	1195.09	3.73
M	1650	0.9	98.3	2.40E-16	487.370	0.0	1	3121.39	5.75
Total gas								431.20	
	No age plateau								
K04-7-14F				*J=.009524*	*±0.5%*	*wt.=0.009 g*		312KD43	
B	800	2.2	13.4	4.22E-16	10.846	2.0	6	177.35	7.01
C	900	6.2	81.8	1.21E-15	24.241	2.5	10	374.75	0.92
D	950	6.5	97.5	1.28E-15	25.052	4.2	13	386.04	0.78
E	1000	10.5	99.0	2.05E-15	22.829	5.3	15	354.93	0.54
F	1050	14.8	99.0	2.90E-15	22.160	6.1	21	345.46	0.38
G	1100	15.7	98.2	3.08E-15	21.971	5.5	30	342.78	0.42
H	1150	17.7	98.0	3.47E-15	21.828	1.2	29	340.75	0.45
I	1200	15.9	98.6	3.11E-15	45.032	0.2	14	643.87	0.69
J	1250	5.7	96.8	1.12E-15	30.855	0.1	6	464.79	0.99
K	1300	1.8	88.7	3.60E-16	56.643	0.1	0	778.35	2.44
L	1400	2.3	94.0	4.46E-16	98.008	0.0	0	1189.42	1.98
M	1650	0.6	92.3	1.26E-16	183.589	0.0	0	1824.02	7.04
Total gas								449.00	
	No age plateau								


K04-7-14E
White mica
Apparent Age (Ma)
600
500
400
300
200
100
0
10
20
30
40
50
60
70
80
90
100
$^{39}Ar_K$ Released (%)

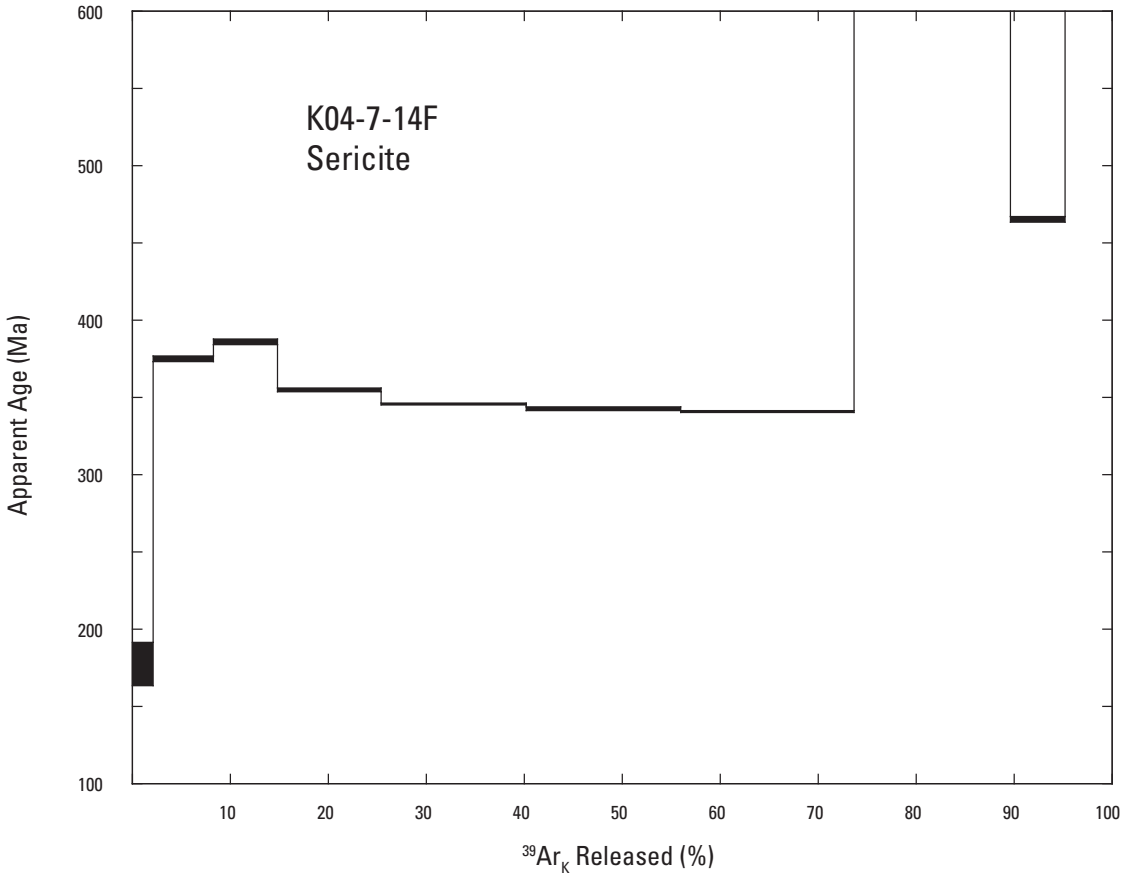
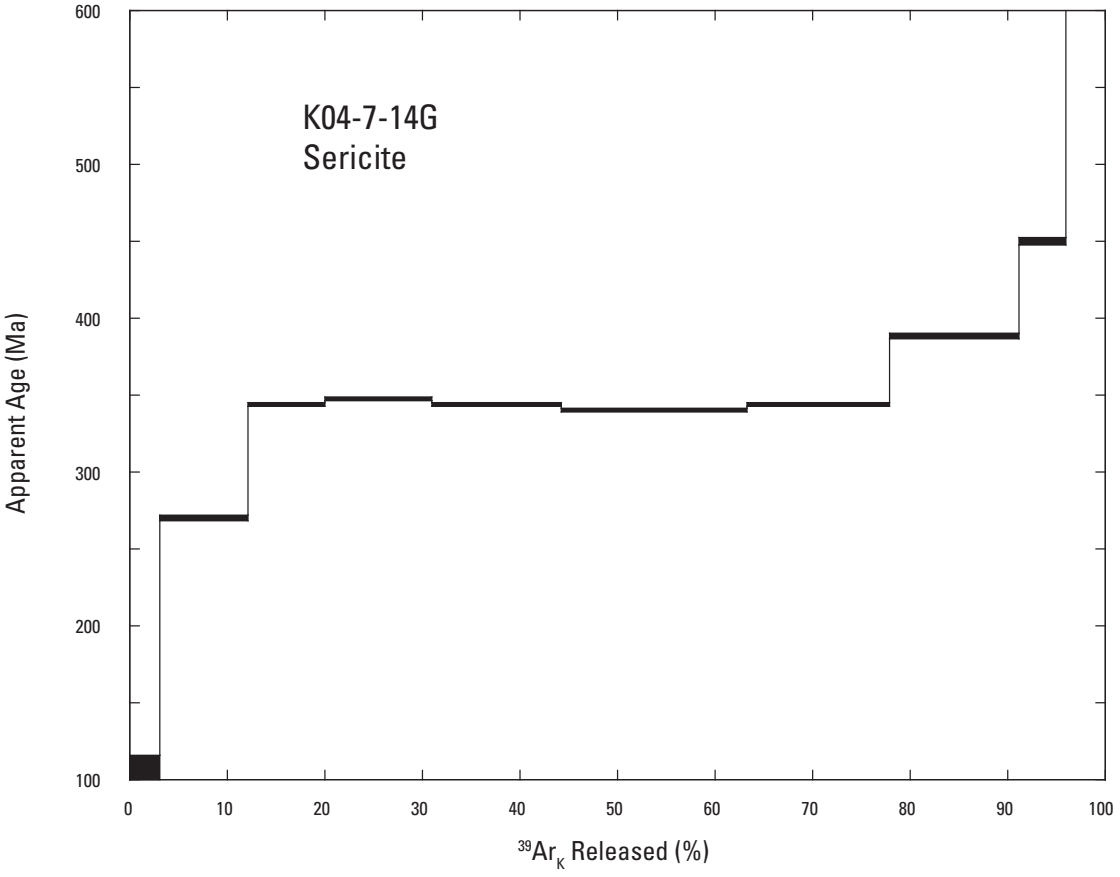

K04-7-14F
Sericite
Apparent Age (Ma)
600
500
400
300
200
100
10
20
30
40
50
60
70
80
90
100
$^{39}Ar_K$ Released (%)

Table 2. $^{40}Ar/^{39}Ar$ analytical data.-- Continued

Step	Temperature (^{o}C)	^{39}Ar [% of total	Radiogenic yield (%)	$^{39}Ar_k$ (moles)	$^{40}Ar^*/^{39}Ar_k$	Apparent K/Ca	Apparent K/Cl	Apparent age (Ma)	Error (Ma)
K04-7-14G				*J=.009523*	*±0.5%*	*wt.=0.00106 g*		316KD43	
A	600	0.1	5.8	9.30E-18	18.245	0.8	2	289.02	118.40
B	800	3.1	11.7	4.45E-16	6.114	2.4	7	102.10	6.86
C	900	9.0	82.0	1.30E-15	16.948	3.9	10	269.93	0.81
D	950	7.9	94.7	1.14E-15	22.047	4.8	10	343.83	0.85
E	1000	10.9	98.0	1.58E-15	22.316	5.1	9	347.64	0.67
F	1050	13.2	98.2	1.90E-15	22.062	5.4	10	344.04	0.61
G	1100	19.0	98.0	2.74E-15	21.813	2.3	13	340.50	0.46
H	1150	14.6	97.4	2.11E-15	22.048	0.8	14	343.84	0.60
I	1200	13.3	97.8	1.92E-15	25.222	0.4	9	388.36	0.71
J	1250	4.8	95.9	6.86E-16	29.710	0.3	2	449.48	1.25
K	1300	1.9	91.3	2.80E-16	89.055	0.1	0	1107.96	3.30
L	1400	1.7	97.9	2.49E-16	311.664	0.1	0	2486.48	6.28
M	1650	0.4	95.7	6.06E-17	498.923	0.0	0	3156.08	15.96
Total gas								455.00	
	No age plateau								
K04-7-14H				*J=.009522*	*±0.5%*	*wt.=0.00130 g*		318KD43	
B	800	0.8	7.7	5.38E-16	5.351	6.1	8	89.65	6.20
C	900	3.6	79.3	2.40E-15	12.994	14.6	20	210.45	0.53
D	950	3.3	97.2	2.24E-15	21.680	28.1	20	338.58	0.57
E	1001	4.6	98.4	3.06E-15	23.694	52.3	23	367.02	0.44
F	1050	6.4	99.4	4.26E-15	23.104	126.1	31	358.74	0.32
G	1100	8.7	99.5	5.82E-15	22.150	162.9	51	345.25	0.33
H	1150	14.6	99.5	9.78E-15	21.532	146.8	74	336.46	0.20
I	1200	20.1	99.6	1.35E-14	21.461	174.5	74	335.45	0.22
J	1250	18.8	99.7	1.26E-14	21.456	145.8	60	335.39	0.35
K	1300	15.5	99.6	1.04E-14	21.500	131.9	43	336.01	0.22
L	1400	2.1	95.9	1.42E-15	22.406	31.0	0	348.88	0.74
M	1650	1.5	96.9	1.01E-15	26.354	23.6	3	403.92	0.81
Total gas								334.70	
	54.4 % of gas released on plateau in steps 1200^{0}C through 1300^{0}C						Plateau age =	335.70	1.60


K04-7-14G
Sericite
Apparent Age (Ma)
600
500
400
300
200
100
0
10
20
30
40
50
60
70
80
90
100
$^{39}Ar_K$ Released (%)

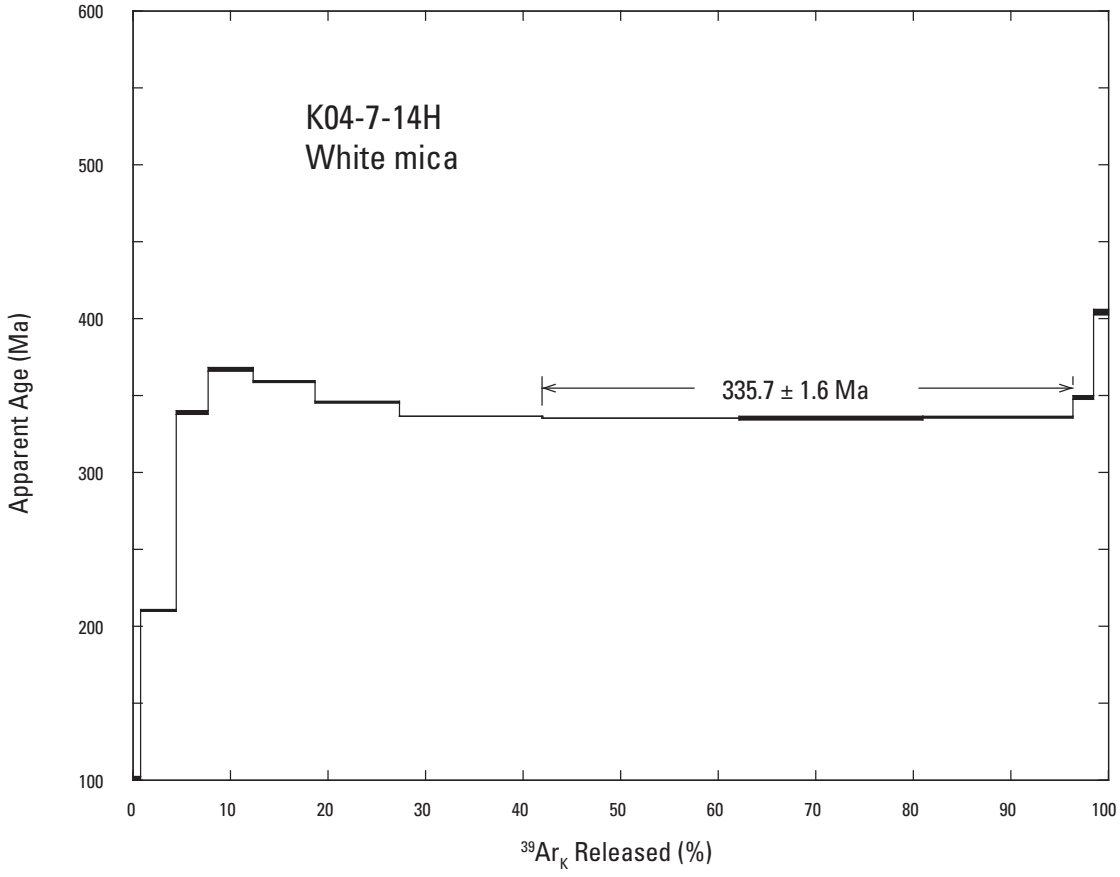
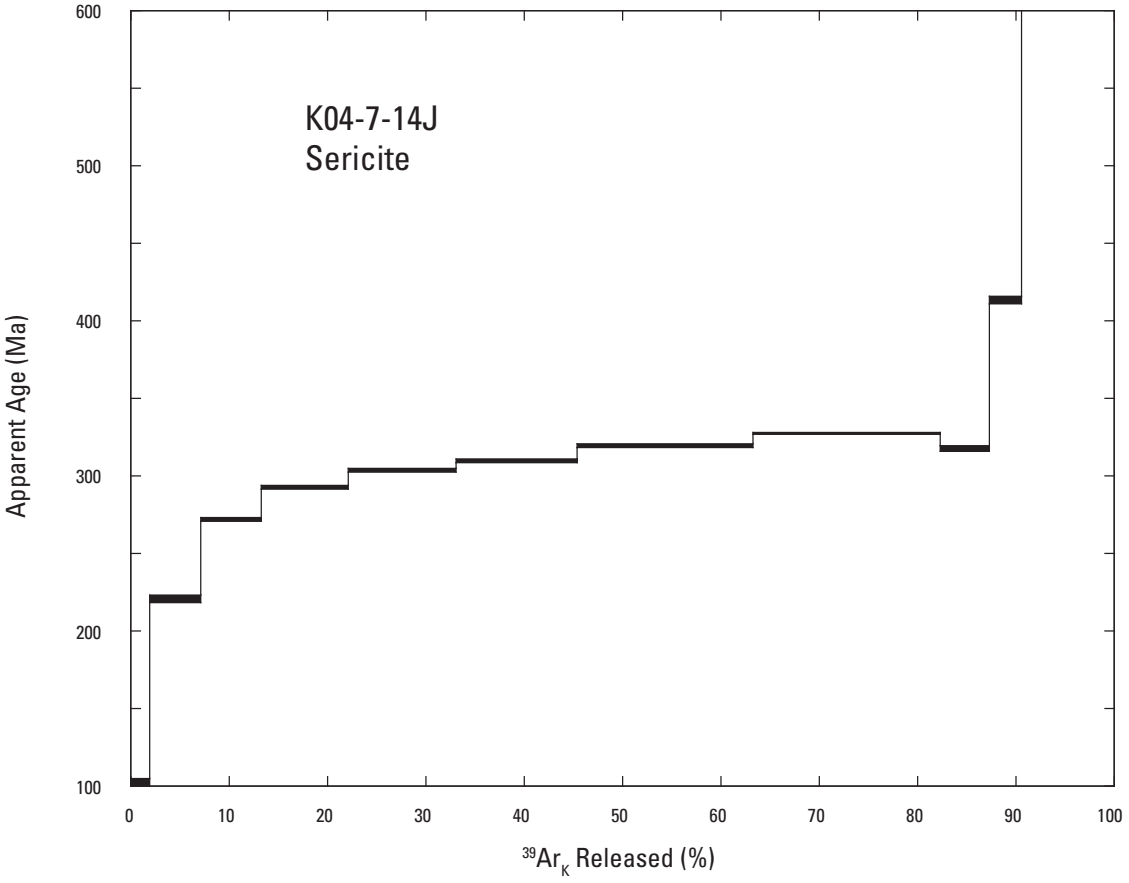

K04-7-14H
White mica
335.7 ± 1.6 Ma
Apparent Age (Ma)
600
500
400
300
200
100
0
10
20
30
40
50
60
70
80
90
100
$^{39}Ar_K$ Released (%)

Table 2. $^{40}Ar/^{39}Ar$ analytical data.-- Continued

Step	Temperature (°C)	^{39}Ar [% of total	Radiogenic yield (%)	$^{39}Ar_k$ (moles)	$^{40}Ar^*/^{39}Ar_k$	Apparent K/Ca	Apparent K/Cl	Apparent age (Ma)	Error (Ma)
K04-7-14J				*J=.009521*	*±0.5%*	*wt.=0.00102 g*		322KD43	
B	800	1.9	3.6	4.15E-16	4.876	1.9	6	81.86	11.67
C	900	5.2	59.9	1.11E-15	13.679	2.4	10	220.87	1.16
D	950	6.0	94.5	1.29E-15	17.095	3.6	12	272.05	0.68
E	1000	8.9	97.8	1.89E-15	18.514	4.3	12	292.90	0.47
F	1050	11.0	98.6	2.35E-15	19.230	4.4	15	303.32	0.49
G	1100	12.3	91.8	2.61E-15	19.690	2.8	23	309.98	0.49
H	1150	18.0	99.1	3.83E-15	20.337	1.5	33	319.32	0.50
I	1200	19.0	98.9	4.06E-15	20.887	0.9	22	327.22	0.43
J	1250	5.1	96.1	1.08E-15	20.258	0.4	5	318.18	0.95
K	1300	3.1	95.4	6.70E-16	27.044	0.2	1	413.34	1.10
L	1400	6.7	97.1	1.43E-15	45.433	0.2	0	648.50	0.95
M	1650	2.8	96.1	5.93E-16	56.409	0.1	1	775.54	1.51
Total gas								344.80	
	No age plateau								
K04-7-14K				*J=.009516*	*±0.5%*	*wt.=0.00115 g*		334KD43	
B	800	1.1	7.0	2.23E-16	8.746	1.6	4	144.23	13.88
C	900	2.1	56.7	4.11E-16	14.952	1.3	4	239.99	2.24
D	950	2.5	96.2	5.00E-16	22.982	2.1	5	356.81	1.60
E	1000	5.4	98.9	1.09E-15	23.913	2.8	7	369.88	0.77
F	1050	9.5	99.1	1.91E-15	23.641	2.7	13	366.07	0.59
G	1100	10.9	99.0	2.18E-15	22.692	1.9	20	352.73	0.54
H	1150	14.6	98.9	2.93E-15	22.113	0.8	21	344.53	0.38
I	1200	22.0	99.5	4.41E-15	22.561	0.4	25	350.88	0.34
J	1250	15.2	99.1	3.03E-15	23.502	1.1	16	364.12	0.42
K	1300	13.0	98.7	2.59E-15	27.370	1.0	1	417.60	0.51
L	1400	1.9	97.1	3.74E-16	77.998	0.1	0	1001.56	3.44
M	1650	1.8	95.2	3.59E-16	39.150	0.3	1	571.29	1.94
Total gas								377.80	
	No age plateau								


K04-7-14J
Sericite
Apparent Age (Ma)
600
500
400
300
200
100
0
10
20
30
40
50
60
70
80
90
100
$^{39}Ar_K$ Released (%)

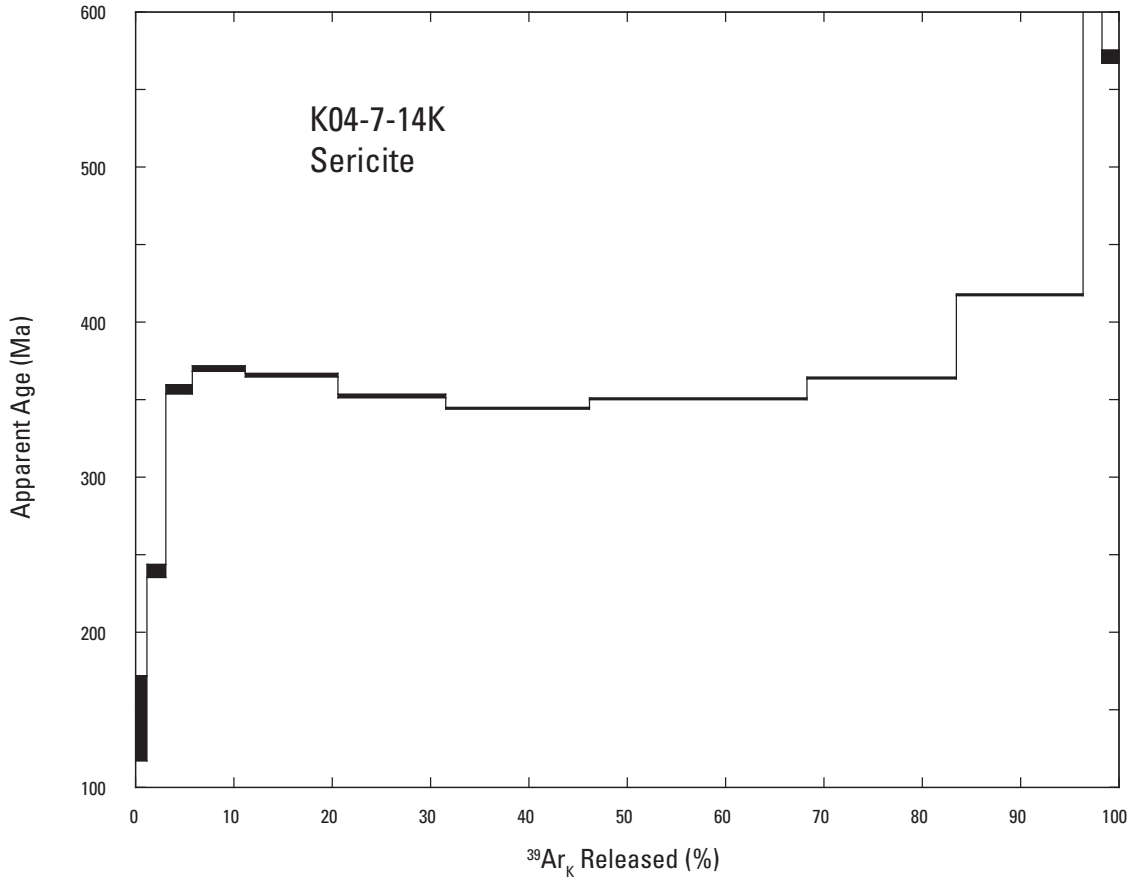
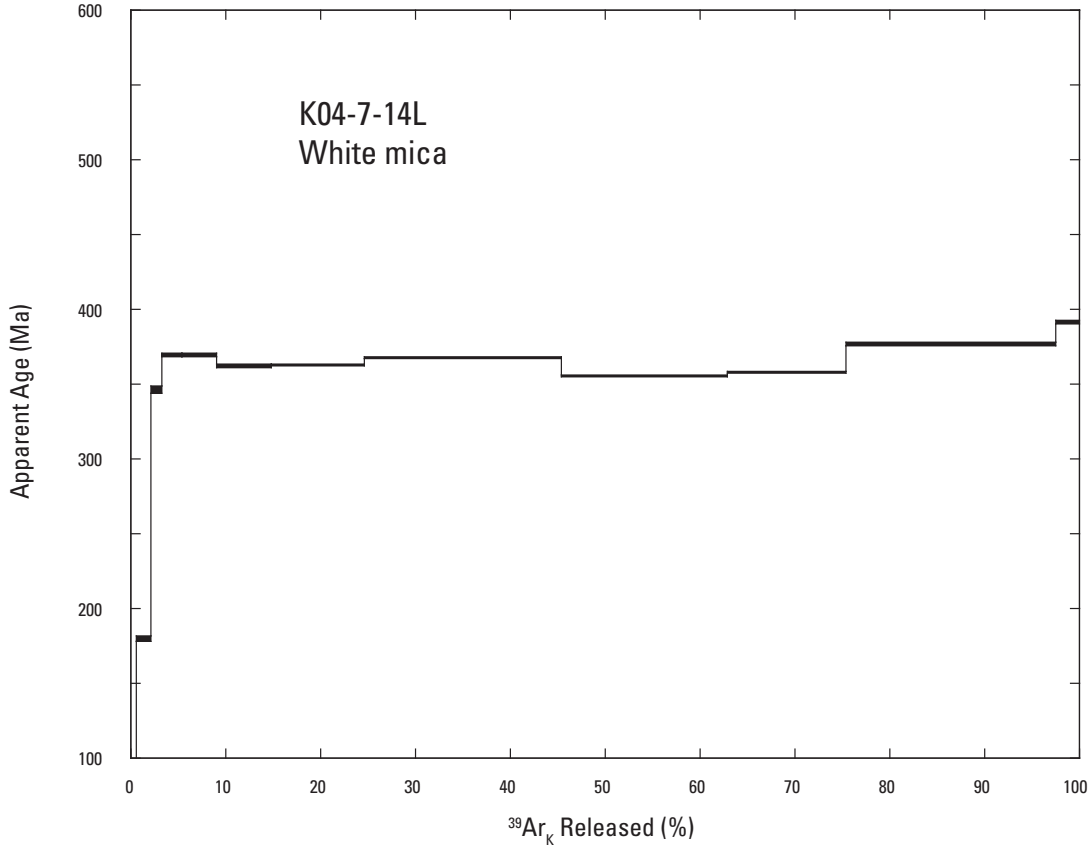

K04-7-14K
Sericite
Apparent Age (Ma)
600
500
400
300
200
100
0
10
20
30
40
50
60
70
80
90
100
$^{39}Ar_K$ Released (%)

Table 2. $^{40}Ar/^{39}Ar$ analytical data.-- Continued

Step	Temperature (^oC)	^{39}Ar [% of total	Radiogenic yield (%)	$^{39}Ar_k$ (moles)	$^{40}Ar^*/^{39}Ar_k$	Apparent K/Ca	Apparent K/Cl	Apparent age (Ma)	Error (Ma)
K04-7-14L				*J=.009519*	*±0.5%*	*wt.=0.00110 g*		328KD43	
B	800	0.6	5.9	3.97E-16	3.239	6.7	8	54.78	7.07
C	900	1.4	69.5	9.60E-16	11.023	8.4	10	180.01	0.97
D	950	1.2	97.0	7.94E-16	22.238	13.5	10	346.41	1.02
E	1000	2.2	98.6	1.45E-15	23.879	25.3	10	369.51	0.76
F	1050	3.6	99.3	2.38E-15	23.888	95.8	15	369.64	0.50
G	1100	5.8	99.4	3.88E-15	23.363	77.9	28	362.28	0.40
H	1150	9.9	99.3	6.63E-15	23.400	97.0	52	362.80	0.30
I	1200	20.7	98.9	1.38E-14	23.766	244.5	71	367.92	0.45
J	1250	17.5	99.7	1.17E-14	22.870	160.0	61	355.33	0.26
K	1300	12.6	99.5	8.42E-15	23.077	118.6	42	358.26	0.30
L	1400	22.1	98.7	1.47E-14	24.400	64.7	2	376.79	0.42
M	1650	2.4	98.0	1.63E-15	25.423	3.7	5	390.99	0.61
Total gas								361.80	
	No age plateau								
K04-7-14M				*J=.009519*	*±0.5%*	*wt.=0.00108g*		330KD43	
A	600	0.8	11.1	6.14E-16	3.337	5.1	8	56.42	4.72
B	800	0.3	55.9	2.52E-16	5.572	6.6	14	93.24	3.12
C	900	0.9	85.6	6.56E-16	11.893	8.1	12	193.48	1.20
D	950	1.3	95.3	9.78E-16	19.922	12.5	11	313.28	0.77
E	1000	2.4	98.1	1.74E-15	23.383	26.1	12	362.56	0.53
F	1050	3.9	98.6	2.87E-15	23.166	59.1	18	359.50	0.43
G	1100	6.7	98.5	4.93E-15	22.242	74.6	42	346.46	0.37
H	1150	17.7	97.8	1.30E-14	21.496	80.0	76	335.85	0.33
I	1200	17.5	99.2	1.28E-14	21.397	143.9	71	334.45	0.21
J	1250	11.2	98.8	8.21E-15	21.408	95.0	44	334.60	0.30
K	1300	12.1	98.3	8.92E-15	21.388	127.2	3	334.32	0.29
L	1400	18.4	99.1	1.35E-14	21.485	167.5	3	335.70	0.32
M	1650	6.7	99.0	4.88E-15	21.616	98.7	15	337.56	0.29
Total gas								333.20	
	76.9 % of gas released on plateau in steps 1200^0C through 1300^0C						Plateau age =	334.80	1.60


K04-7-14L
White mica
Apparent Age (Ma)
600
500
400
300
200
100
0
10
20
30
40
50
60
70
80
90
100
$^{39}Ar_K$ Released (%)

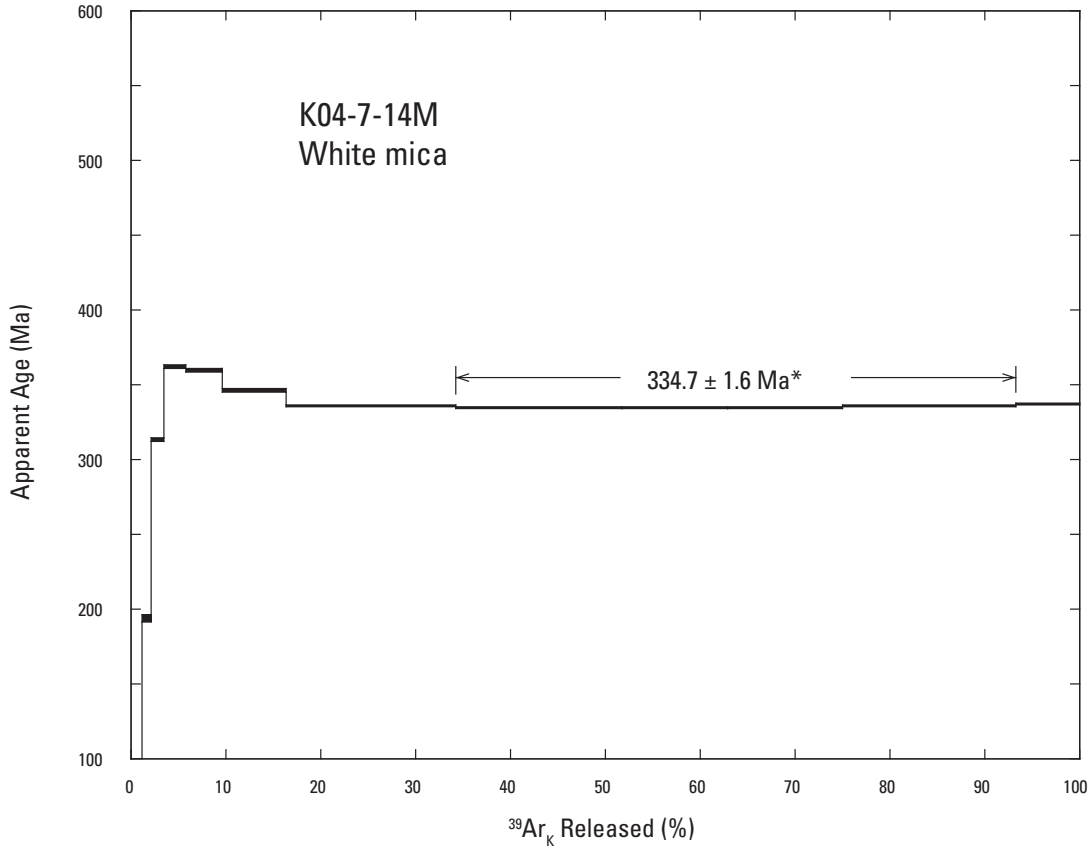
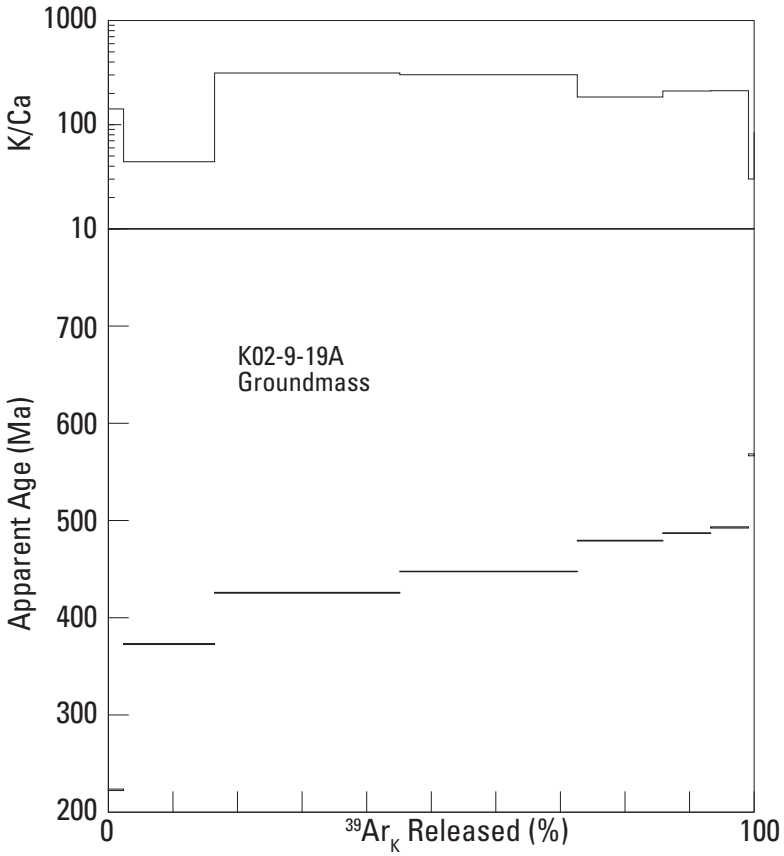

K04-7-14M
White mica
334.7 ± 1.6 Ma*
Apparent Age (Ma)
600
500
400
300
200
100
0
10
20
30
40
50
60
70
80
90
100
$^{39}Ar_K$ Released (%)

Table 2. $^{40}Ar/^{39}Ar$ analytical data.-- Continued

Step	Temperature (°C)	^{39}Ar (% of total	Radiogenic yield (%)	$^{39}Ar_k$ (moles)	$^{40}Ar^*/^{39}Ar_k$	Apparent K/Ca	Apparent K/Cl	Apparent age (Ma)	Error (Ma)
GROUNDMASS									
K02-9-19A				*J=.012306*	*±0.5%*	*wt.=0.0548 g*		81KD32	
A	550	2.4	84.1	1.26E-13	10.694	141.7	41	223.04	0.38
B	650	14.1	99.3	7.51E-13	18.662	44.1	436	372.94	0.27
C	750	28.7	99.8	1.53E-12	21.626	313.4	***	425.69	0.19
D	850	27.5	99.7	1.46E-12	22.882	301.7	86037	447.58	0.13
E	950	13.2	99.5	7.05E-13	24.733	184.3	3561	479.34	0.18
F	1000	7.4	99.3	3.95E-13	25.182	210.6	4821	486.98	0.16
G	1050	5.9	98.4	3.12E-13	25.531	212.3	2314	492.88	0.34
H	1250	0.9	90.1	4.72E-14	30.046	30.1	241	567.58	0.52
Total gas			99.1	5.33E-12	22.274	235.0	24679	437.00	
No age plateau									
K02-9-20A				*J=.012278*	*±0.5%*	*wt.=0.0538 g*		112KD32	
A	550	0.8	65.5	3.30E-14	12.917	4.7	80	265.57	1.26
B	650	4.3	97.9	1.81E-13	13.705	3.7	387	280.57	0.35
C	750	13.2	99.6	5.58E-13	19.233	12.2	***	382.44	0.31
D	850	22.0	99.8	9.28E-13	19.177	15.4	***	381.43	0.18
E	950	42.3	99.9	1.78E-12	20.650	11.0	***	407.66	0.17
F	1000	13.8	99.9	5.83E-13	22.874	2.4	8022	446.53	0.13
G	1050	1.8	99.3	7.68E-14	32.952	0.3	563	612.89	0.53
H	1250	1.7	99.2	7.24E-14	42.629	0.2	321	759.39	0.78
Total gas			99.5	4.21E-12	20.689	10.2	1143	408.34	
No age plateau									


1000
100
10
K/Ca
700
600
500
400
300
200
Apparent Age (Ma)
K02-9-19A
Groundmass
0
100
$^{39}Ar_K$ Released (%)

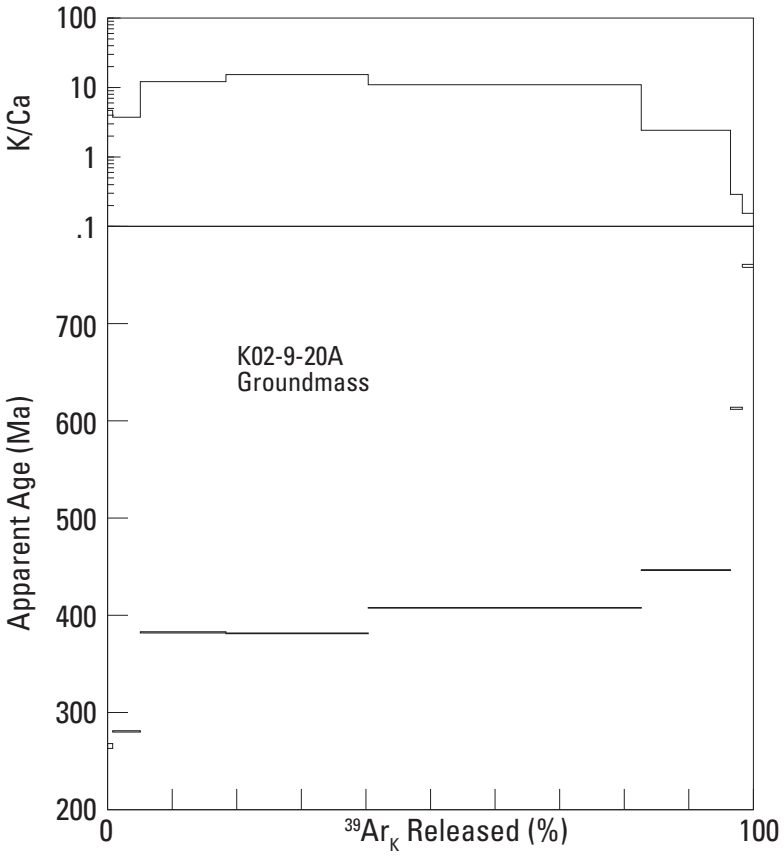

100
10
1
.1
K/Ca
700
600
500
400
300
200
Apparent Age (Ma)
K02-9-20A
Groundmass
0
100
$^{39}Ar_K$ Released (%)

Table 2. $^{40}Ar/^{39}Ar$ analytical data.-- Continued

Step	Temperature (°C)	^{39}Ar [% of total	Radiogenic yield (%)	$^{39}Ar_k$ (moles)	$^{40}Ar^*/^{39}Ar_k$	Apparent K/Ca	Apparent K/Cl	Apparent age (Ma)	Error (Ma)
BIOTITE									
K02-9-19F				*J=.012371*	*±0.5%*	*wt.=0.000493 g*		91KD32	
A	1450	100	99.1	1.46E-13	23.266	59.3	446	456.33	0.17
K02-9-19H				*J=.012351*	*±0.5%*	*wt.=0.000548 g*		95KD32	
A	1450	100	98.9	1.53E-13	23.896	59.8	285	466.55	0.22
K02-9-19I				*J=.012361*	*±0.5%*	*wt.=0.000515 g*		99KD32	
A	1450	100	98.9	1.54E-13	22.320	39.1	307	439.55	0.18
K02-9-19K				*J=.012350*	*±0.5%*	*wt.=0.000501 g*		106KD32	
A	1450	100	96.5	1.27E-13	18.843	47.1	279	377.42	0.22
K04-7-13I				*J = 0.009523*	*± 0.5%*	*wt.=0.000585 g*		296KD43	
B	1450	100	98.7	2.56E-14	41.110	42.86	20	596.03	0.60
K04-7-14A				*J=.009524*	*±0.5%*	*wt.=0.540 g*		300KD43	
B	1450	84	98.0	2.52E-14	25.830	32.5	16	396.79	0.44
K04-7-14B				*J=.009524*	*±0.5%*	*wt.=0.506 g*		302KD43	
B	1450	100	95.0	2.85E-14	34.455	26.8	4	511.97	0.47
K04-7-14C				*J=.009524*	*±0.5%*	*wt.=0.577 g*		308KD43	
B	1450	100	98.6	3.09E-14	24.244	11.8	4	374.79	0.31
K04-7-14K				*J=.009521*	*±0.5%*	*wt.= 0.541g*		324KD43	
B	1450	100	98.2	3.18E-14	28.930	17.2	4	438.92	0.33
K04-7-14M				*J=.009524*	*±0.5%*	*wt. = 0.554 g*		332KD43	
B	1450	100	86.4	2.72E-14	16.096	20.1	3	257.06	0.29
K-SPAR									
K02-9-19G				*J=.012342*	*±0.5%*	*wt.=0.0018 g*		93KD32	
A	750	9.9	99.4	1.28E-13	10.551	115.9	115016	220.83	0.36
B	850	15.0	99.7	1.94E-13	12.229	105.8	***	253.59	0.24
C	950	9.0	99.7	1.17E-13	13.479	55.5	26141	277.60	0.31
D	1000	5.1	99.7	6.65E-14	14.705	39.1	7753	300.86	0.66
E	1050	4.5	99.3	5.82E-14	15.461	50.8	3667	315.05	0.58
F	1075	2.9	98.6	3.15E-14	15.830	48.9	2367	321.93	1.05
G	1100	2.2	98.6	2.85E-14	16.159	32.9	1364	328.06	1.16
H	1150	1.9	98.3	2.42E-14	16.326	53.4	1288	331.15	1.54
I	1250	13.2	98.3	1.71E-13	17.279	84.6	1164	348.72	0.21
J	1450	36.1	98.8	4.67E-13	16.882	418.0	2705	341.43	0.12
Total gas			99	1.29E-12	15.067	202.2	15556	307.68	

No age plateau

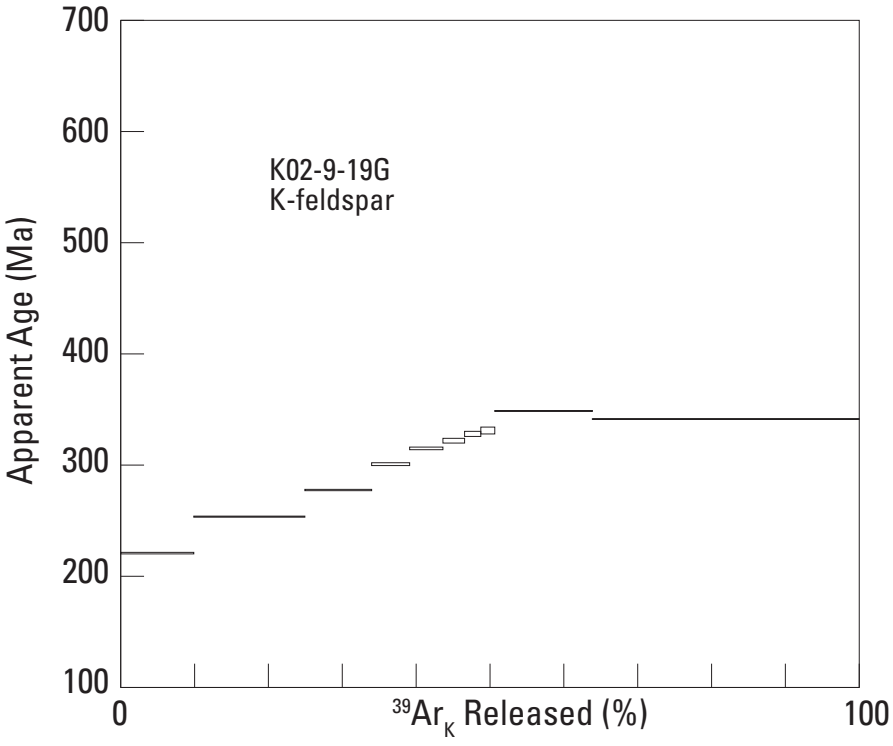
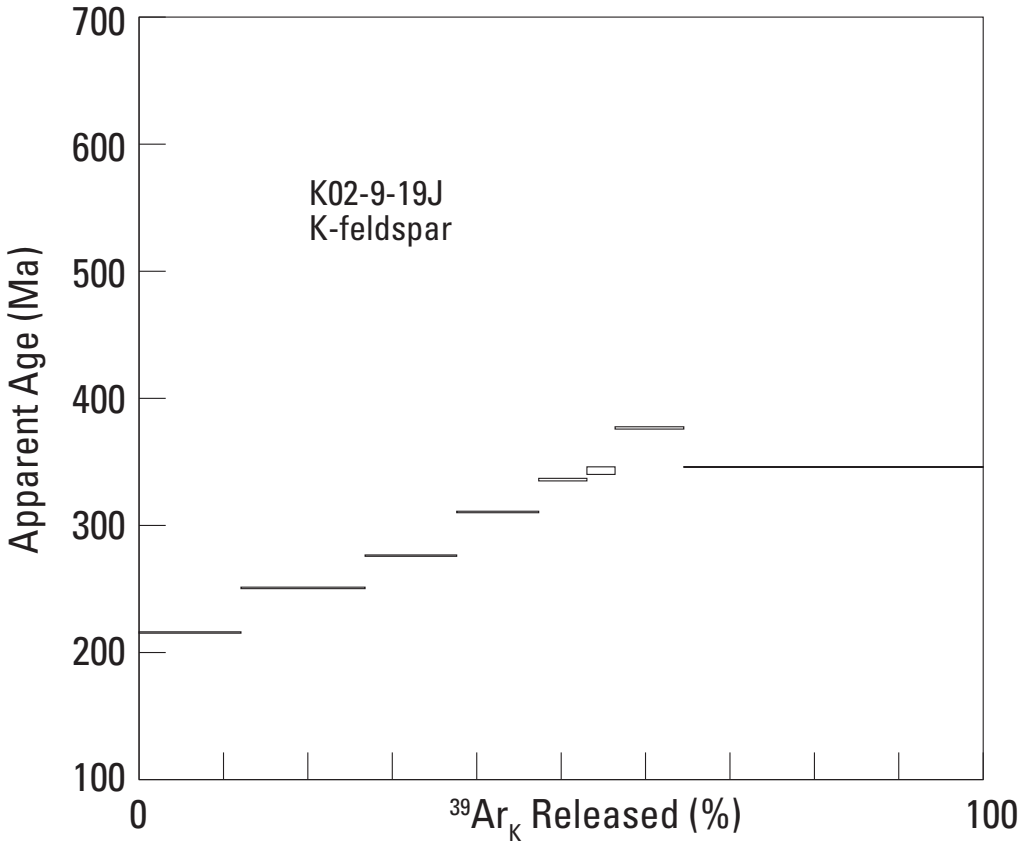

700
600
500
400
300
200
100
Apparent Age (Ma)
K02-9-19G
K-feldspar
0
100
$^{39}Ar_K$ Released (%)

Table 2. $^{40}Ar/^{39}Ar$ analytical data.-- Continued

Step	Temperature (°C)	^{39}Ar (% of total	Radiogenic yield (%)	$^{39}Ar_k$ (moles)	$^{40}Ar^*/^{39}Ar_k$	Apparent K/Ca	Apparent K/Cl	Apparent age (Ma)	Error (Ma)
K02-9-19J				*J=.012337*	*±0.5%*	*wt.=0.0020 g*		103KD32	
A	750	12.1	99.2	9.53E-14	10.298	186.6	***	215.76	0.27
B	850	14.7	99.8	1.16E-13	12.094	191.9	***	250.87	0.30
C	950	10.9	99.7	8.58E-14	13.415	132.3	***	276.29	0.27
D	1050	9.7	99.7	7.67E-14	15.231	83.5	14449	310.63	0.28
E	1100	5.7	98.9	4.51E-14	16.596	141.0	4513	336.03	0.50
F	1150	3.3	99.2	2.64E-14	16.980	81.0	2270	343.11	1.49
G	1250	8.1	98.5	6.42E-14	18.827	121.1	2481	376.79	0.44
H	1450	35.5	98.1	2.80E-12	17.140	591.3	4065	346.04	0.16
Total gas			98.9	7.90E-12	15.083	303.6	3380	307.86	
	No age plateau								
K04-7-14D				*J=.009524*	*±0.5%*	*wt. =0.001185 g*		310KD43	
A	550	0.2	13.3	1.87E-16	14.436	2.4	5	232.40	11.21
B	650	0.1	20.0	8.32E-17	12.073	2.9	6	196.35	16.43
C	700	0.1	32.7	1.12E-16	12.803	2.7	7	207.57	13.02
D	800	0.3	68.6	3.16E-16	17.069	4.6	7	271.74	2.52
E	900	0.7	91.3	7.60E-16	15.951	6.3	11	255.14	0.99
F	950	1.2	97.5	1.29E-15	15.814	12.8	14	253.10	0.64
G	1000	2.2	99.1	2.43E-15	16.817	27.0	18	268.02	0.40
H	1050	4.5	99.4	4.90E-15	18.464	36.0	33	292.24	0.29
I	1100	6.5	99.4	7.16E-15	20.234	36.0	60	317.93	0.30
J	1150	8.2	99.4	8.98E-15	21.012	31.6	89	329.09	0.24
K	1200	9.7	99.6	1.06E-14	22.084	29.4	65	344.38	0.38
L	1215	5.5	99.7	6.05E-15	23.359	35.5	49	362.39	0.32
M	1250	6.2	99.7	6.80E-15	25.595	34.1	34	393.55	0.35
N	1275	5.3	99.8	5.84E-15	27.562	36.2	34	420.52	0.33
O	1300	5.1	99.6	5.62E-15	32.105	35.3	27	481.32	0.43
P	1350	8.7	99.1	9.55E-15	40.030	40.3	2	582.69	0.83
Q	1450	28.4	99.5	3.10E-14	38.982	59.5	34	569.60	0.42
R	1550	6.5	99.6	7.13E-15	38.572	39.3	15	564.47	0.45
S	1650	0.5	99.0	5.59E-16	47.094	11.5	4	668.49	1.82
Total gas								455.00	
	No age plateau								


700
600
500
400
300
200
100
Apparent Age (Ma)
K02-9-19J
K-feldspar
0
100
$^{39}Ar_K$ Released (%)

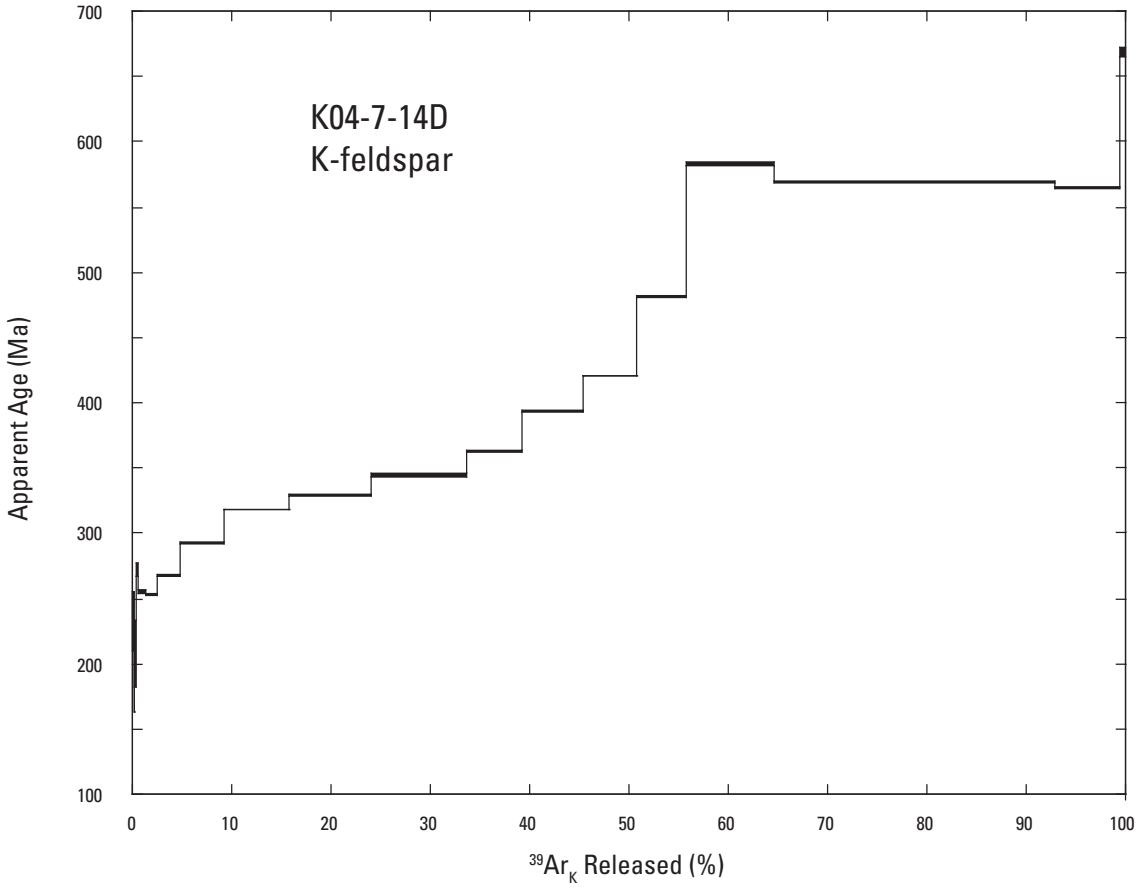
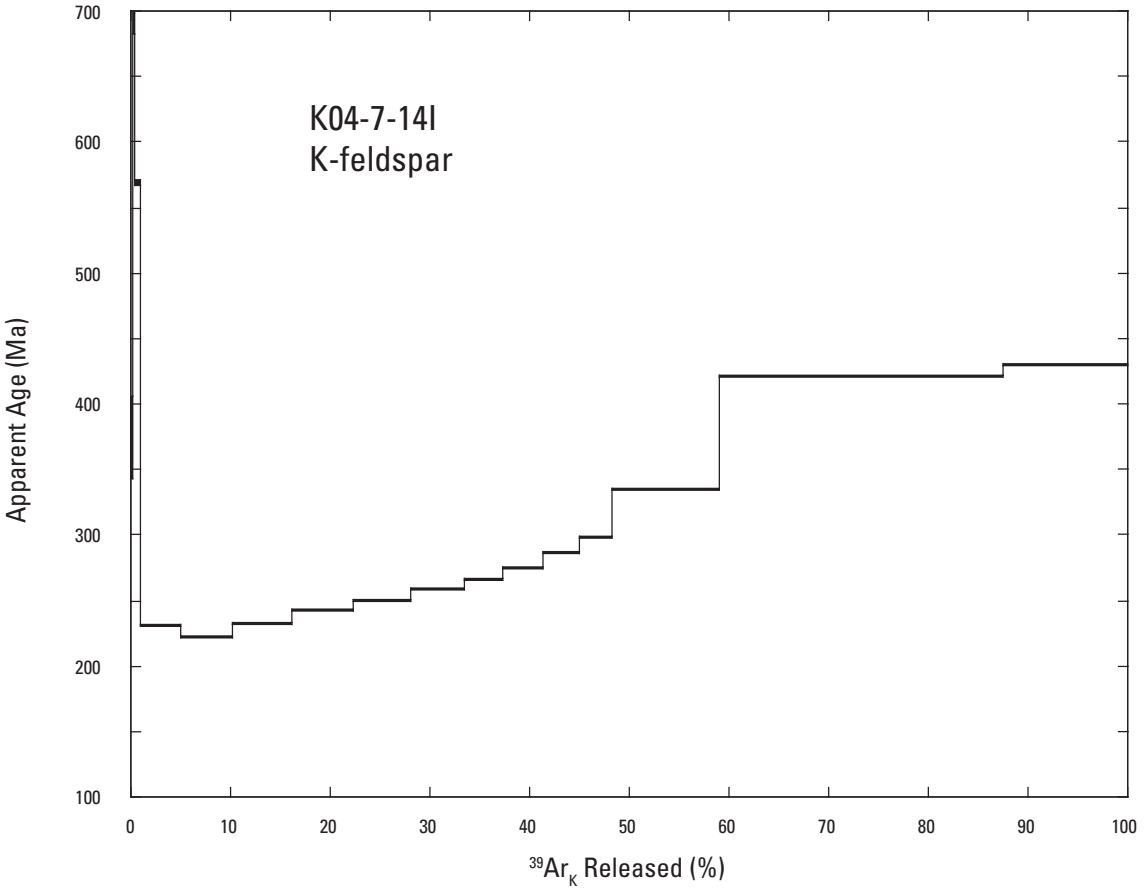
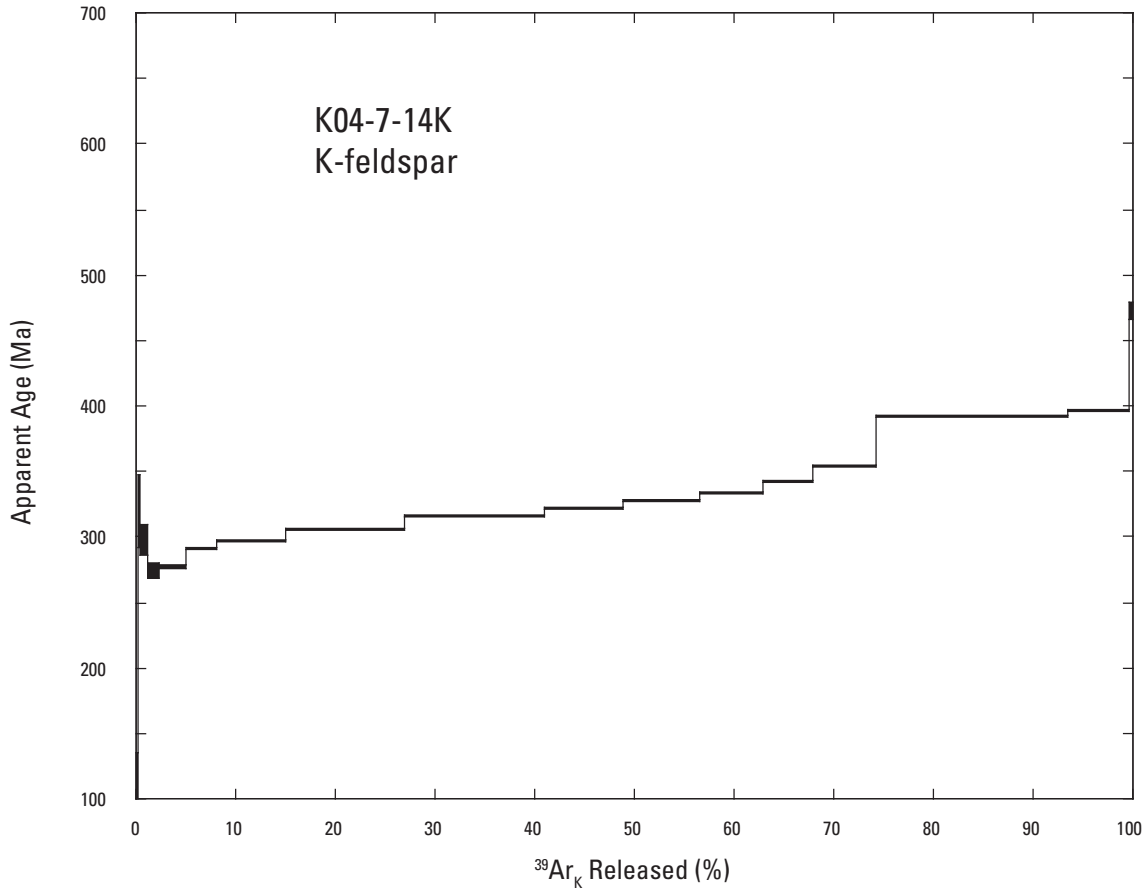

700
600
500
400
300
200
100
Apparent Age (Ma)
K04-7-14D
K-feldspar
0
10
20
30
40
50
60
70
80
90
100
$^{39}Ar_K$ Released (%)

Table 2. $^{40}Ar/^{39}Ar$ analytical data.-- Continued

Step	Temperature (°C)	^{39}Ar [% of total	Radiogenic yield (%)	$^{39}Ar_k$ (moles)	$^{40}Ar^*/^{39}Ar_k$	Apparent K/Ca	Apparent K/Cl	Apparent age (Ma)	Error (Ma)
K04-7-14I				*J=.009520*	*±0.5%*	*wt.=0.001078 g*		320KD43	
C	700	0.1	19.3	1.31E-16	24.242	3.7	7	374.62	15.51
D	800	0.2	62.6	2.38E-16	48.982	5.0	9	690.51	3.70
E	900	0.6	92.0	6.76E-16	38.946	12.5	15	568.95	1.39
F	950	4.0	98.2	4.21E-15	14.315	61.3	41	230.49	0.28
G	1000	5.2	99.3	5.52E-15	13.777	67.6	43	222.34	0.22
H	1050	5.9	99.7	6.21E-15	14.436	132.1	39	232.31	0.22
I	1100	6.2	99.6	6.56E-15	15.106	125.2	48	242.41	0.22
J	1150	5.8	99.5	6.12E-15	15.617	138.3	59	250.06	0.26
K	1200	5.4	99.2	5.68E-15	16.176	88.7	56	258.40	0.24
L	1215	3.9	99.3	4.07E-15	16.664	115.2	41	265.65	0.35
M	1250	4.1	99.3	4.28E-15	17.280	83.8	33	274.75	0.29
N	1275	3.5	99.5	3.70E-15	18.105	67.9	27	286.88	0.35
O	1300	3.4	99.4	3.55E-15	18.843	65.8	24	297.66	0.38
P	1350	10.8	99.2	1.14E-14	21.466	82.2	2	335.46	0.38
Q	1450	28.3	99.0	2.99E-14	27.624	112.2	26	421.20	0.32
R	1550	12.6	98.6	1.32E-14	28.273	113.0	18	430.02	0.53
Total gas								336.80	
	No age plateau								
K04-7-14K				*J=.009517*	*±0.5%*	*wt.=0.001121 g*		326KD43	
C	700	0.2	4.5	1.26E-16	6.221	2.1	5	103.78	15.37
D	800	0.3	13.4	1.65E-16	20.346	1.7	5	319.32	13.85
E	900	0.7	26.1	4.40E-16	18.850	2.5	5	297.68	5.75
F	950	1.2	42.6	7.56E-16	17.232	4.9	7	273.97	2.98
G	1000	2.7	66.8	1.65E-15	17.459	9.5	11	277.31	0.92
H	1050	3.0	79.1	1.87E-15	18.383	12.9	22	290.87	0.63
I	1100	7.0	89.8	4.40E-15	18.765	15.0	36	296.43	0.36
J	1150	11.8	94.4	7.35E-15	19.397	13.1	69	305.62	0.47
K	1200	14.2	96.2	8.85E-15	20.082	11.3	73	315.52	0.25
L	1215	7.7	95.1	4.83E-15	20.489	9.7	47	321.37	0.32
M	1250	7.8	94.9	4.87E-15	20.922	9.0	31	327.60	0.35
N	1275	6.3	93.4	3.90E-15	21.365	12.8	26	333.92	0.42
O	1300	5.0	90.8	3.14E-15	21.921	14.7	20	341.83	0.50
P	1350	6.4	90.9	3.96E-15	22.779	14.2	25	353.99	0.45
Q	1450	19.2	94.6	1.20E-14	25.528	16.9	2	392.36	0.52
R	1550	6.3	93.7	3.91E-15	25.767	24.0	9	395.67	0.39
S	1650	0.3	89.5	2.02E-16	31.455	3.0	1	472.43	3.31
Total gas								337.20	
	No age plateau								


K04-7-14I
K-feldspar
Apparent Age (Ma)
700
600
500
400
300
200
100
0
10
20
30
40
50
60
70
80
90
100
$^{39}Ar_K$ Released (%)


K04-7-14K
K-feldspar
Apparent Age (Ma)
700
600
500
400
300
200
100
0
10
20
30
40
50
60
70
80
90
100
$^{39}Ar_K$ Released (%)

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