

Table S2 Comparison of nuclear reactors used for  $^{40}\text{Ar}/^{39}\text{Ar}$  irradiations

Reactor	Slow/fast	$(^{36}\text{Ar}/^{37}\text{Ar})_{\text{Ca}}$	$(^{39}\text{Ar}/^{37}\text{Ar})_{\text{Ca}}$	$(^{40}\text{Ar}/^{39}\text{Ar})_{\text{K}}$	Cd shielding	J/h	Vertical gradients	Horizontal gradients	Reference
(irradiation position)	neutron flux	$\times 10^{-4}$	$\times 10^{-4}$	$\times 10^{-4}$	(mm)	$\times 10^{-4}$	%/cm	%/cm	
MJTR	3.8	$4.17 \pm 0.07$	$18.4 \pm 3.6$	$146.5 \pm 42.4$	0.5	0.21	~0.68	0.45	This study
CMRR	- <sup>1</sup>	2.34	6.17	23.2	0.5	3.4	-	-	(Bai et al., 2021)
HFETR	0.1	$3.52 \pm 0.11$	10.9 - 15	~92.3 - ~188.0	0.5	2.8	3.3	7.1	(Li et al., 2019)
49-2(H4)	-	2.64	6.87	71.5	0.5	1.7	-	-	(Wang et al., 1986)
49-2(E7)	2.5	$1.17 \pm 0.05$	$7.56 \pm 0.30$	$239 \pm 12$	-	0.58	-	0.1	(Wang et al., 1985)
49-2(H8)	-	$2.78 \pm 0.14$	$8.52 \pm 0.28$	$11.82 \pm 1.2$	-	2.1	0.7	-	(Wang et al., 2009)
CLICIT	-	$2.700 \pm 0.0004$	$7.02 \pm 0.12$	$7.3 \pm 0.9$	-	2.63- 2.78	0.7 -1.6	-	(Renne et al., 2008; Renne et al., 2015)
CLOCIT		$2.65 \pm 0.01$	$9.10 \pm 0.28$	$4 \pm 6$	-	1.45- 1.53	0.6-1.0%	-	(Rutte et al., 2018)
GSTR	0.9	$2.64 \pm 0.017$	$6.73 \pm 0.037$	$59 \pm 7$ $101 \pm 5$ $10 \pm 10$	No	2.5	3.5	<0.5	(Dalrymple et al., 1981)
HFBR (core)	0.65	$2.31 \pm 0.01$	$6.45 \pm 0.29$	<20 $123 \pm 24$	-	35	-	-	(Alexander and K., 1974)
Herald (core)	1.7	-	-	-	-	2.8	-	-	(Brereton, 1970; Brereton, 1972; Turner et al., 1973)
GETR	7.5	$1.1 \pm 0.2$ $3.05 \pm 0.06$ $3.15 \pm 0.09$	$6.7 \pm 0.3$ $7.32 \pm 0.15$ $7.23 \pm 0.28$	$164 \pm 13$ $625 \pm 9$	-	4	-	-	(Alexander and K., 1974)
JMTR	12.1	$3.61 \pm 0.17$	$7.96 \pm 0.2$	$140.1 \pm 85.8$ $3008 \pm 138$	0.8 No	1.7	1.5	13	(Ishizuka, 1998)
HIFAR	~50	$3.06 \pm 0.02$	$7.27 \pm 0.5$	$270 \pm 20$ $30 \pm 10$ ~20	0.2 0.5 1.0	0.2	13	-	(Mcdougall, 1985)
McMaster	19	$2.54 \pm 0.09$	$6.51 \pm 0.31$	$156 \pm 4$	-	1.1	-	-	(Bottomley and Derekyork, 1976)
Ford (H-5)	-	2.21-2.26	8.00-8.25	250-470	-	0.78	0.4	-	(Heizler and Markharrison, 1988; Foland et al., 1989)

FR-2		$2.7 \pm 0.2$	$6.85 \pm 0.20$	-	-	-	0.5	-	(Stettler et al., 1974)
RRF	13	$2.13 \pm 0.04$	$10.2 \pm 0.3$	$1340 \pm 10$	-	0.56	-	-	(Kameshwaran et al., 1983)
FRG-1	-	$41.4 \pm 2.3$	$9.3 \pm 0.1$	$141 \pm 2$	0.2mm	0.24	5.9	1.8	(Schwarz and Trieloff, 2007)
LVR-15	-	-	-	-	Yes	-	2.1	2.2	(Rutte et al., 2015)

Note: <sup>1</sup> “-” represent not mentioned in the literature.

MJTR: Min Jiang Testing Reactor of the Nuclear Power Institute of China;

CMRR: China Mianyang Research Reactor of the China Academy of Engineering Physics;

HFETR: High Flux Engineering Test Reactor of the NPIC;

49-2: 49-2 research reactor of the Institute of Atomic Energy;

CLOCIT: The Cadmium-Lined Outer-Core Irradiation Tube;

CLICIT: The Cadmium-Lined Inner-Core Irradiation Tube;

GSTR: Geological Survey TRIGA Reactor;

HFBR: High Flux Beam Reactor of Brookhaven National Laboratory;

Herald: herald reactor at AWRE Aldermaston;

GETR: General electric test reactor, vallecitos nuclear center, Pleasanton California;

JMTR: Japan Material Testing Reactor;

HIFAR: High Flux Australian Reactor;

McMaster: enriched-uranium reactor at McMaster University;

Ford: Ford Nuclear Reactor at the University of Michigan;

FR-2: reactor 2 in the Federal Republic of Germany;

RRF: Research Reactor Facility, University of Missouri (Columbia);

FRG-1: the reactor 1 in the Federal Republic of Germany;

LVR-15: the a Light Water Reactor-15 installed in the Czech Republic;

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