

¹⁸⁶Re ε decay (3.7185 d) [2000Mi03,1994Sc39](#)

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	J. C. Batchelder and A. M. Hurst, M. S. Basunia		NDS 183, 1 (2022)	1-Mar-2022

Parent: ¹⁸⁶Re: E=0.0; J $^\pi$ =1 $^-$; T_{1/2}=3.7185 d 5; Q(ε)=581.3 12; % ε decay=7.50 10

¹⁸⁶Re-% ε decay: From %I(W K x ray)=6.02 7 ([1994Sc39](#)) (assuming $\omega_K=0.958$, $\varepsilon K=0.7906$ from $\varepsilon K=0.7931$ (g.s.) and 0.7819 (122.64 level) (theory) for $\approx 3.5:1$ feeding of g.s. and 122.64 level, %I γ (122)=0.6026 25 (see gamma table) and $\alpha(K)(122.64)$ from E2 theory). In [2016Lu16](#) from text it appears that the efficiency calibration of the detectors below 250 keV was weakly established – so their data are not considered for deducing the ε branching of ¹⁸⁶Re. Also note %I γ (137) (¹⁸⁶Os)=10.12 42 ([2016Lu16](#)) compared to 9.47 3, deduced value in ¹⁸⁶Re β^- decay.

Others: [2016Lu16](#), [1964Ma36](#), [1969La11](#), [1991Co17](#), [1991Go23](#), [2000Wo02](#), [1972Se06](#).

¹⁸⁶W Levels

E(level)	J $^\pi$	T _{1/2}
0.0	0 $^+$	
122.64 2	2 $^+$	1.040 ns 10

 ε radiations

E(decay)	E(level)	I ε [†]	Log ft	Comments
(458.7 12)	122.64	1.67 1	7.776 4	$\varepsilon K=0.7838$ 2; $\varepsilon L=0.1638$ 1; $\varepsilon M+=0.05242$ 4 I($\varepsilon + \beta^+$): from %I γ (122) and $\alpha(122)$.
(581.3 12)	0.0	5.83 10	7.465 8	$\varepsilon K=0.79456$ 8; $\varepsilon L=0.15595$ 6; $\varepsilon M+=0.04948$ 3 I($\varepsilon + \beta^+$): from % $\varepsilon=7.50$ 10 minus % ε (to 122 level)=1.67 1.

[†] Absolute intensity per 100 decays.

 $\gamma(^{186}\text{W})$

Summary of experimental I(x-ray) (%) compared with calculated values.

Note that data shown under [1972Se06](#) and [1991Go23](#) are relative intensities normalized so I(137 γ , ¹⁸⁶Os)=10.0 1). For data in [2016Lu16](#), see ¹⁸⁶Re % ε comments above.

Radiation	1972Se06	1991Co17	1991Go23	1994Sc39	2016Lu16	Calculated
W L x ray				1.91 21		1.95 8
W L α x ray	2.64 2					
W L β x ray	0.60 10					
W K α_2 x ray	1.89 1		1.83 4	1.75 4	1.61 6	1.72 4
W K α_1 x ray	3.31 1		3.15 7	3.02 6	2.71 10	2.95 7
W K β_2 x ray			0.28 1	0.268 6	0.258 11	0.225 5
W K β_1 x ray	1.16 1		1.05 3	0.986 20	0.866 35	0.646 16
W K α x ray		4.46 13				4.73 7
Os 137 γ	10.0 1	9.45 16	10.0 1	9.39 9	10.12 42	[9.47 3]

E γ	I γ [‡]	E $_i$ (level)	J $^\pi_i$	E f	J $^\pi_f$	Mult.	α [†]	Comments
122.64 2	0.6026 25	122.64	2 $^+$	0.0	0 $^+$	E2	1.767	$\alpha(K)=0.584$ 9; $\alpha(L)=0.897$ 13; $\alpha(M)=0.226$ 4 $\alpha(N)=0.0533$ 8; $\alpha(O)=0.00734$ 11; $\alpha(P)=4.40 \times 10^{-5}$ 7 E γ : From adopted gammas. Other: E $\gamma=122.61$ (1972Se06). I γ : Weighted average of 0.565% 24 (2016Lu16), 0.600% 13 (1991Co17), 0.603% 6 (1994Sc39), 0.604% 3 (2000Mi03),

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$^{186}\text{Re} \varepsilon$ decay (3.7185 d) 2000Mi03,1994Sc39 (continued)

$\gamma(^{186}\text{W})$ (continued)

E_γ	$E_i(\text{level})$	Comments
		0.597% 8 (2000Wo02). Others: 0.606 9 (1991Go23 , if $I(137\gamma)=9.47$), 0.606 19 (1972Se06 , if $I(137\gamma)=9.47$). Mult.: K:L2:L3:M=0.32 8:0.267 27:0.222 11:0.100 15 (1969La11). Other: 1964Ma36 .

[†] [Additional information 1](#).

[‡] Absolute intensity per 100 decays.

$^{186}\text{Re} \varepsilon$ decay (3.7185 d) 2000Mi03,1994Sc39Decay SchemeIntensities: $I_{(\gamma+ce)}$ per 100 parent decays