$^{144}_{58}\mathrm{Ce}_{86}$

1 Decay Scheme

Ce-144 (half-life 284.89 d) undergoes 100% beta minus decay to Pr-144m (half-life of 7.2 min) with a branching fraction of 0.0115, and Pr-144 (half-life of 17.29 min) with a branching fraction of 0.9885.

Le cérium 144 (284,89 d) se désintègre par émission bêta moins, pour 1,15 % vers le praséodyme 144m (7,2 min) et pour 98,85 % vers le praséodyme 144 (17,29 min).

2 Nuclear Data

$T_{1/2}(^{144}\mathrm{Ce})$	:	284,89	(6)	d
$T_{1/2}(^{144}\mathrm{Pr})$	:	17,29	(4)	min
$Q^-(^{144}\mathrm{Ce})$	:	318,6	(8)	keV

2.1 β^- Transitions

	Energy (keV)	Probability (%)	Nature	lg ft
$\beta^-_{0,4}$	185,1 (8)	19,2 (1)	1st forbidden non-unique	7,27
$\beta^-_{0,2}$	238,5 (8)	3,9 (2)	1st forbidden non-unique	8,33
$\beta^-_{0,0}$	318,6 (8)	76,9 (3)	1st forbidden non-unique	7,42

2.2 Gamma Transitions and Internal Conversion Coefficients

	Energy (keV)	$\mathrm{P}_{\gamma+\mathrm{ce}}$ (%)	Multipolarity	α_K	α_L	α_M	α_T
$\gamma_{4,3}$(Pr)	33,563 (9)	1,28 (6)	M1		3,70 (6)	0,780 (11)	4,69 (7)
$\gamma_{3,1}$(Pr)	40,92 (3)	1,16 (18)	M1		2,06 (3)	0,434 (7)	2,61 (4)
$\gamma_{4,2}$(Pr)	53,395 (5)	0,90 (4)	M1	6,75 (10)	0,942 (14)	0,199 (3)	7,94 (12)
$\gamma_{1,0}$(Pr)	59,03 (3)	1,15 (23)	M3	408 (6)	618 (9)	155,0 (23)	1221 (18)
$\gamma_{2,0}$(Pr)	80,120 (4)	4,83 (17)	M1	2,08 (3)	0,288 (4)	0,0608 (9)	2,45 (4)
$\gamma_{3,0}$(Pr)	99,952 (9)	0,128 (6)	E2	1,214 (17)	0,71 (1)	0,1599 (23)	2,12 (3)
$\gamma_{4,0}$(Pr)	133,5152 (20)	17,01 (19)	M1	0,486 (7)	0,0668 (10)	0,01408 (20)	0,571 (8)

3 Atomic Data

3.1 Pr

ω_K : 0,914 (4)
$\bar{\omega}_L$: 0,132 (5)
n_{KL} : 0,871 (4)

3.1.1 X Radiations

		Energy (keV)	Relative probability
X_K			
	$K\alpha_2$	35,5506	54,8
	$K\alpha_1$	36,0267	100
	$K\beta_3$	40,6533	30,5
	$K\beta_1$	40,7487	
	$K\beta_5''$	41,05	
	$K\beta_2$	41,774	7,8
	$K\beta_4$	41,877	
	$KO_{2,3}$	41,968	
X_L			
	$L\ell$	4,453	
	$L\alpha$	5,013 - 5,033	
	$L\eta$	4,929	
	$L\beta$	5,489 - 5,851	
	$L\gamma$	6,327 - 6,617	

3.1.2 Auger Electrons

	Energy (keV)	Relative probability
Auger K		
KLL	28,162 - 29,890	100
KLX	33,576 - 36,004	49,4
KXY	38,97 - 41,95	6,1
Auger L	2,90 - 4,91	1922

4 Electron Emissions

		Energy (keV)	Electrons (per 100 disint.)
e_{AL}	(Pr)	2,90 - 4,91	9,88 (10)
e_{AK}	(Pr)		0,80 (4)
	KLL	28,162 - 29,890	
	KLX	33,576 - 36,004	
	KXY	38,97 - 41,95	
$ec_{4,2\ T}$	(Pr)	11,404 - 53,373	0,802 (42)
$ec_{4,2\ K}$	(Pr)	11,404 (5)	0,682 (35)
$ec_{1,0\ T}$	(Pr)	17,04 - 59,01	1,15 (23)
$ec_{1,0\ K}$	(Pr)	17,04 (3)	0,38 (8)
$ec_{4,3\ T}$	(Pr)	26,728 - 33,563	1,05 (6)
$ec_{4,3\ L}$	(Pr)	26,728 - 27,599	0,83 (5)
$ec_{4,3\ M}$	(Pr)	32,052 - 32,632	0,175 (10)
$ec_{4,3\ N}$	(Pr)	33,259 - 33,561	0,039 (2)
$ec_{3,1\ T}$	(Pr)	34,09 - 40,90	0,84 (13)
$ec_{3,1\ L}$	(Pr)	34,09 - 34,96	0,66 (10)
$ec_{2,0\ T}$	(Pr)	38,129 - 80,120	3,43 (18)
$ec_{2,0\ K}$	(Pr)	38,129 (4)	2,91 (15)
$ec_{3,1\ M}$	(Pr)	39,41 - 39,99	0,139 (22)
$ec_{3,1\ N}$	(Pr)	40,62 - 40,92	0,0311 (49)
$ec_{4,2\ L}$	(Pr)	46,560 - 47,431	0,0951 (49)
$ec_{4,2\ M}$	(Pr)	51,884 - 52,464	0,0201 (10)
$ec_{4,2\ N}$	(Pr)	53,091 - 53,393	0,00448 (23)
$ec_{1,0\ L}$	(Pr)	52,20 - 53,07	0,58 (12)
$ec_{1,0\ M}$	(Pr)	57,52 - 58,10	0,146 (30)
$ec_{1,0\ N}$	(Pr)	58,73 - 59,03	0,033 (7)
$ec_{2,0\ L}$	(Pr)	73,285 - 74,156	0,403 (21)
$ec_{2,0\ M}$	(Pr)	78,609 - 79,189	0,085 (4)
$ec_{2,0\ N}$	(Pr)	79,816 - 80,118	0,019 (1)
$ec_{4,0\ T}$	(Pr)	91,524 - 133,515	6,18 (22)
$ec_{4,0\ K}$	(Pr)	91,524 (2)	5,26 (19)
$ec_{4,0\ L}$	(Pr)	126,680 - 127,551	0,723 (25)
$ec_{4,0\ M}$	(Pr)	132,004 - 132,584	0,152 (5)
$ec_{4,0\ N}$	(Pr)	133,211 - 133,513	0,0341 (12)
$\beta^-_{0,4}$	max:	185,1 (8)	19,2 (1)
	avg:	50,29 (24)	
$\beta^-_{0,2}$	max:	238,5 (8)	3,9 (2)
	avg:	66,24 (25)	
$\beta^-_{0,0}$	max:	318,6 (8)	76,9 (3)
	avg:	91,3 (3)	

5 Photon Emissions

5.1 X-Ray Emissions

		Energy (keV)	Photons (per 100 disint.)	
XL	(Pr)	4,453 - 6,617	1,54 (4)	
XKα_2	(Pr)	35,5506	2,41 (5)	Kα
XKα_1	(Pr)	36,0267	4,40 (9)	Kα
XKβ_3	(Pr)	40,6533	1,34 (3)	K$'\beta_1$
XKβ_1	(Pr)	40,7487	1,34 (3)	K$'\beta_1$
XKβ_5''	(Pr)	41,05	1,34 (3)	K$'\beta_1$
XKβ_2	(Pr)	41,774	0,343 (10)	K$'\beta_2$
XKβ_4	(Pr)	41,877	0,343 (10)	K$'\beta_2$
XKO$_{2,3}$	(Pr)	41,968	0,343 (10)	K$'\beta_2$

5.2 Gamma Emissions

	Energy (keV)	Photons (per 100 disint.)
$\gamma_{4,3}$(Pr)	33,563 (9)	0,225 (11)
$\gamma_{3,1}$(Pr)	40,92 (3)	0,32 (5)
$\gamma_{4,2}$(Pr)	53,395 (5)	0,101 (5)
$\gamma_{1,0}$(Pr)	59,03 (3)	0,00094 (19)
$\gamma_{2,0}$(Pr)	80,120 (4)	1,40 (5)
$\gamma_{3,0}$(Pr)	99,952 (9)	0,041 (2)
$\gamma_{4,0}$(Pr)	133,5152 (20)	10,83 (12)

6 Main Production Modes

U − 235(n,f)Ce − 144

U − 238(n,f)Ce − 144

Pu − 239(n,f)Ce − 144

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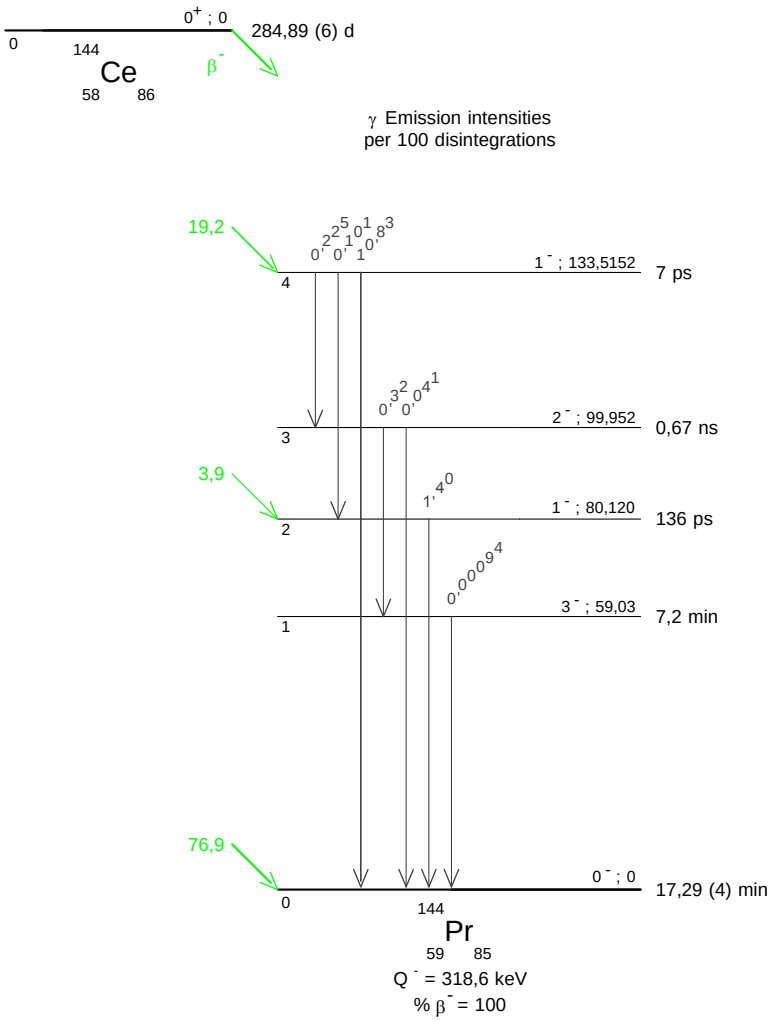
0+ ; 0
284,89 (6) d
0
144
Ce
58
86
β-
γ Emission intensities
per 100 disintegrations
19,2
0,2 2,5 0,1 1,0 0,8 3
1- ; 133,5152
7 ps
4
0,3 2,0 0,4 1
2- ; 99,952
0,67 ns
3
3,9
1,4 0
1- ; 80,120
136 ps
2
0,0 0,0 0,9 4
3- ; 59,03
7,2 min
1
76,9
0- ; 0
17,29 (4) min
0
144
Pr
59
85
Q- = 318,6 keV
% β- = 100