



1 Decay Scheme

Pr-144 (half-life of 17.29 min) undergoes 100% beta minus decay to various excited levels and predominantly to the ground state of Nd-144.

Le praséodyme 144 (17,29 min) se désintègre à 100 % par émission bêta moins vers les niveaux excités et le niveau fondamental du néodyme 144.

2 Nuclear Data

$T_{1/2}(^{144}\text{Pr})$:	17,29	(4)	min
$T_{1/2}(^{144}\text{Nd})$:	2,3	(3)	10^{15} a
$Q^-(^{144}\text{Pr})$:	2997,4	(24)	keV

2.1 β^- Transitions

	Energy (keV)	Probability (%)	Nature	lg ft
$\beta_{0,12}^-$	254,4 (24)	0,00035 (6)	1st forbidden non-unique	8,1
$\beta_{0,11}^-$	321,8 (24)	0,00096 (8)	1st forbidden non-unique	8
$\beta_{0,10}^-$	341,9 (24)	0,00018 (3)	1st forbidden non-unique	8,8
$\beta_{0,8}^-$	628,6 (24)	0,00027 (6)	1st forbidden unique	9,7
$\beta_{0,7}^-$	811,7 (24)	1,021 (10)	allowed	6,32
$\beta_{0,6}^-$	912,7 (24)	0,00708 (6)	1st forbidden non-unique	8,7
$\beta_{0,5}^-$	924,5 (24)	0,00065 (6)	1st forbidden unique	10,2
$\beta_{0,4}^-$	1436,5 (24)	0,0017 (3)	1st forbidden unique	10,8
$\beta_{0,1}^-$	2300,8 (24)	1,116 (3)	1st forbidden unique	9,17
$\beta_{0,0}^-$	2997,4 (24)	97,852 (10)	1st forbidden non-unique	6,53

2.2 Gamma Transitions and Internal Conversion Coefficients

	Energy (keV)	P _{γ+ce} (%)	Multipolarity	α _K (10 ⁻³)	α _L (10 ⁻⁴)	α _M (10 ⁻⁴)	α _T (10 ⁻³)	α _π (10 ⁻⁴)
γ _{7,4} (Nd)	624,83 (3)	0,00118 (3)	E1	2,07 (3)	2,67 (4)	0,561 (8)	2,41 (4)	
γ _{7,3} (Nd)	674,88 (4)	0,00301 (14)	E2	4,60 (7)	6,86 (10)	1,465 (21)	5,47 (8)	
γ _{1,0} (Nd)	696,507 (4)	1,42 (7)	E2	4,27 (6)	6,31 (9)	1,348 (19)	5,07 (7)	
γ _{3,1} (Nd)	814,310 (23)	0,00331 (14)	E1	1,198 (17)	1,528 (22)	0,321 (5)	1,391 (20)	
γ _{4,1} (Nd)	864,359 (16)	0,00270 (14)	M1+48,5%E2	3,38 (14)	4,56 (16)	0,96 (4)	3,96 (16)	
γ _{12,4} (Nd)	1182,07 (7)	0,00006 (3)	E2	1,353 (19)	1,82 (3)	0,384 (6)	1,587 (23)	0,0410 (6)
γ _{5,1} (Nd)	1376,35 (3)	0,00041 (4)	M1+10,4%E2	1,35 (3)	1,75 (4)	0,368 (8)	1,61 (4)	0,398 (6)
γ _{6,1} (Nd)	1388,12 (4)	0,00707 (6)	E2	0,984 (14)	1,297 (19)	0,274 (4)	1,190 (17)	0,416 (6)
γ _{7,1} (Nd)	1489,156 (3)	0,286 (3)	E1	0,397 (6)	0,495 (7)	0,1038 (15)	0,663 (10)	2,04 (3)
γ _{4,0} (Nd)	1560,920 (13)	0,00021 (3)	E2	0,786 (11)	1,024 (15)	0,216 (3)	1,014 (15)	0,981 (14)
γ _{8,1} (Nd)	1672,26 (4)	0,00021 (6)	M1+2,5%E2	0,892 (14)	1,146 (18)	0,241 (4)	1,189 (18)	1,519 (22)
γ _{11,1} (Nd)	1979,05 (8)	0,00096 (8)	E2	0,505 (7)	0,647 (9)	0,1360 (19)	0,868 (13)	2,81 (4)
γ _{12,1} (Nd)	2046,43 (7)	0,00030 (6)	E2	0,475 (7)	0,607 (9)	0,1277 (18)	0,865 (13)	3,13 (5)
γ _{5,0} (Nd)	2072,91 (3)	0,00024 (3)	E2	0,465 (7)	0,593 (9)	0,1246 (18)	0,865 (13)	3,26 (5)
γ _{7,0} (Nd)	2185,663 (5)	0,731 (10)	E1	0,213 (3)	0,264 (4)	0,0552 (8)	0,959 (14)	7,12 (10)
γ _{8,0} (Nd)	2368,82 (4)	0,000051 (14)	E2	0,365 (6)	0,463 (7)	0,0973 (14)	0,891 (13)	4,67 (7)
γ _{10,0} (Nd)	2655,54 (3)	0,00018 (3)	M1+E2					

3 Atomic Data

3.1 Nd

ω _K	:	0,918	(4)
ω _L	:	0,140	(6)
n _{KL}	:	0,866	(4)

3.1.1 X Radiations

	Energy (keV)	Relative probability
X _K		
Kα ₂	36,8478	55
Kα ₁	37,3614	100
Kβ ₃	42,167	30,7
Kβ ₁	42,2717	
Kβ ₅ ''	42,58	
Kβ ₂	43,335	7,9
Kβ ₄	43,451	
KO _{2,3}	43,548	
X _L		
Lℓ	4,633	
Lα	5,208 - 5,23	
Lη	5,146	
Lβ	5,722 - 6,09	
Lγ	6,604 - 6,901	

3.1.2 Auger Electrons

	Energy (keV)	Relative probability
Auger K		
KLL	29,154 - 30,978	100
KLX	34,798 - 37,340	50
KXY	40,42 - 43,53	6,2
Auger L	3,01 - 5,10	1655

4 Electron Emissions

		Energy (keV)	Electrons (per 100 disint.)
e _{AL}	(Nd)	3,01 - 5,10	0,00551 (18)
e _{AK}	(Nd)		0,00052 (4)
	KLL	29,154 - 30,978	}
	KLX	34,798 - 37,340	
	KXY	40,42 - 43,53	
$\beta_{0,12}^-$	max:	254,4 (24)	}
	avg:	71,05 (8)	
$\beta_{0,11}^-$	max:	321,8 (24)	}
	avg:	92,21 (8)	
$\beta_{0,10}^-$	max:	341,9 (24)	}
	avg:	98,68 (8)	
$\beta_{0,8}^-$	max:	628,6 (24)	}
	avg:	213,04 (9)	
$\beta_{0,7}^-$	max:	811,7 (24)	}
	avg:	267,12 (9)	
$\beta_{0,6}^-$	max:	912,7 (24)	}
	avg:	306,67 (10)	
$\beta_{0,5}^-$	max:	924,5 (24)	}
	avg:	322,77 (9)	
$\beta_{0,4}^-$	max:	1436,5 (24)	}
	avg:	526,25 (10)	
$\beta_{0,1}^-$	max:	2300,8 (24)	}
	avg:	894,90 (11)	
$\beta_{0,0}^-$	max:	2997,4 (24)	}
	avg:	1221,990 (1)	

5 Photon Emissions

5.1 X-Ray Emissions

		Energy (keV)	Photons (per 100 disint.)		
XL	(Nd)	4,633 - 6,901	0,00092 (3)		
XK α_2	(Nd)	36,8478	0,00165 (9)	}	K α
XK α_1	(Nd)	37,3614	0,00300 (15)		
XK β_3	(Nd)	42,167	0,00092 (5)	}	K' β_1
XK β_1	(Nd)	42,2717			
XK β_5''	(Nd)	42,58			
XK β_2	(Nd)	43,335	0,000237 (13)	}	K' β_2
XK β_4	(Nd)	43,451			
XKO _{2,3}	(Nd)	43,548			

5.2 Gamma Emissions

	Energy (keV)	Photons (per 100 disint.)
$\gamma_{7,4}(\text{Nd})$	624,83 (3)	0,00118 (3)
$\gamma_{7,3}(\text{Nd})$	674,88 (4)	0,00299 (14)
$\gamma_{1,0}(\text{Nd})$	696,505 (4)	1,41 (7)
$\gamma_{3,1}(\text{Nd})$	814,308 (23)	0,00331 (14)
$\gamma_{4,1}(\text{Nd})$	864,356 (16)	0,00269 (14)
$\gamma_{12,4}(\text{Nd})$	1182,06 (7)	0,00006 (3)
$\gamma_{5,1}(\text{Nd})$	1376,34 (3)	0,00041 (4)
$\gamma_{6,1}(\text{Nd})$	1388,11 (4)	0,00706 (6)
$\gamma_{7,1}(\text{Nd})$	1489,148 (3)	0,286 (3)
$\gamma_{4,0}(\text{Nd})$	1560,911 (13)	0,00021 (3)
$\gamma_{8,1}(\text{Nd})$	1672,25 (4)	0,00021 (6)
$\gamma_{11,1}(\text{Nd})$	1979,04 (8)	0,00096 (8)
$\gamma_{12,1}(\text{Nd})$	2046,41 (7)	0,00030 (6)
$\gamma_{5,0}(\text{Nd})$	2072,89 (3)	0,00024 (3)
$\gamma_{7,0}(\text{Nd})$	2185,645 (5)	0,73 (1)
$\gamma_{8,0}(\text{Nd})$	2368,80 (4)	0,000051 (14)
$\gamma_{10,0}(\text{Nd})$	2655,51 (3)	0,00018 (3)

6 Main Production Modes

U – 235(n,f)Pr – 144

U – 238(n,f)Pr – 144

Pu – 239(n,f)Pr – 144

Ce – 144(β^-)Pr – 144

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