



1 Decay Scheme

Pr-144m (half-life of 7.2 min) decays 99.94(2)% by an isomeric transition to Pr-144 and 0.06(2)% by beta minus emission to various excited levels of Nd-144.

Le praséodyme 144m (7,2 min) se désintègre à 99,94 % par transition isomérique vers le praséodyme 144 et par émission bêta moins vers trois niveaux excités du néodyme 144.

2 Nuclear Data

$T_{1/2}(^{144\text{m}}\text{Pr})$:	7,2	(2)	min
$T_{1/2}(^{144}\text{Nd})$:	2,3	(3)	10^{15} a
$T_{1/2}(^{144}\text{Pr})$:	17,29	(4)	min
$Q^{IT}(^{144\text{m}}\text{Pr})$:	59,03	(3)	keV
$Q^{-}(^{144\text{m}}\text{Pr})$:	3056,4	(24)	keV

2.1 β^{-} Transitions

	Energy (keV)	Probability (%)	Nature	lg ft
$\beta_{0,13}^{-}$	110,4 (24)	0,030 (3)	(allowed)	4,65
$\beta_{0,9}^{-}$	474,1 (24)	0,010 (3)	(1st forbidden non-unique)	7,15
$\beta_{0,3}^{-}$	1545,5 (24)	0,02 (1)	allowed	8,7

2.2 Gamma Transitions and Internal Conversion Coefficients

	Energy (keV)	$P_{\gamma+ce}$ (%)	Multipolarity	α_K	α_L	α_M	α_T	α_{π}
$\gamma_{1,0}(\text{Pr})$	59,03 (3)	99,94 (2)	M3	408 (6)	618 (9)	155,0 (23)	1221 (18)	
$\gamma_{2,1}(\text{Nd})$	618,108 (16)	0,030 (3)	E2	0,00568 (8)	0,000869 (13)	0,000186 (3)	0,00679 (10)	
$\gamma_{1,0}(\text{Nd})$	696,507 (4)	0,06 (2)	E2	0,00427 (6)	0,000631 (9)	0,0001348 (19)	0,00507 (7)	
$\gamma_{3,1}(\text{Nd})$	814,310 (23)	0,02 (1)	E1	0,001198 (17)	0,0001528 (22)	0,0000321 (5)	0,001391 (20)	
$\gamma_{13,2}(\text{Nd})$	1631,37 (10)	0,030 (3)						
$\gamma_{9,1}(\text{Nd})$	1885,76 (6)	0,010 (3)	M1+1,7%E2	0,000686 (10)	0,0000878 (13)	0,0000185 (3)	0,001052 (15)	0,000255 (4)

3 Atomic Data

3.1 Nd

ω_K	:	0,918	(4)
$\bar{\omega}_L$:	0,140	(6)
n_{KL}	:	0,866	(4)

3.1.1 X Radiations

	Energy (keV)	Relative probability
X_K		
$K\alpha_2$	36,8478	54,1
$K\alpha_1$	37,3614	100
$K\beta_3$	42,167	} 30,5
$K\beta_1$	42,2717	
$K\beta_5''$	42,58	
$K\beta_2$	43,335	} 7,73
$K\beta_4$	43,451	
$KO_{2,3}$	43,548	

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	6,25
Auger L	3,01 - 5,10	1667

3.2 Pr

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

3.2.1 X Radiations

	Energy (keV)	Relative probability
<hr/>		
X _K		
Kα ₂	33,5506	54,8
Kα ₁	36,0267	100
Kβ ₃	40,6533	}
Kβ ₁	40,7487	
Kβ ₅ ''	41,05	
Kβ ₂	41,774	}
Kβ ₄	41,877	
KO _{2,3}	41,968	
X _L		
Lℓ	4,453	
Lα	5,013 - 5,033	
Lη	4,929	
Lβ	5,489 - 5,851	
Lγ	6,327	

3.2.2 Auger Electrons

	Energy (keV)	Relative probability
Auger K		
KLL	28,162 - 29,890	100
KLX	33,576 - 36,004	49,2
KXY	38,97 - 41,95	6,11
Auger L	2,90 - 4,91	3730

4 Electron Emissions

		Energy (keV)	Electrons (per 100 disint.)
e _{AL}	(Nd)	3,01 - 5,10	0,00040 (5)
e _{AK}	(Nd)		0,000038 (8)
	KLL	29,154 - 30,978	}
	KLX	34,798 - 37,340	
	KXY	40,42 - 43,53	
e _{AL}	(Pr)	2,90 - 4,91	69 (10)
e _{AK}	(Pr)		2,87 (15)
	KLL	28,162 - 29,890	}
	KLX	33,576 - 36,004	
	KXY	38,97 - 41,95	
ec _{1,0 T}	(Pr)	17,04 - 59,01	99,9 (21)
ec _{1,0 K}	(Pr)	17,04 (3)	33,4 (7)
ec _{1,0 L}	(Pr)	52,20 - 53,07	50,6 (10)
ec _{1,0 M}	(Pr)	57,52 - 58,10	12,68 (26)
ec _{1,0 N}	(Pr)	58,73 - 59,03	2,84 (6)
ec _{1,0 O}	(Pr)	58,99 - 59,01	0,411 (9)
$\beta_{0,13}^-$	max:	110,4 (24)	}
	avg:	29,0 (7)	
$\beta_{0,9}^-$	max:	474,1 (24)	}
	avg:	143,0 (8)	
$\beta_{0,3}^-$	max:	1545,5 (24)	}
	avg:	570,0 (11)	

5 Photon Emissions

5.1 X-Ray Emissions

		Energy (keV)	Photons (per 100 disint.)	
XK α_2	(Nd)	36,8478	0,000119 (23)	} K α
XK α_1	(Nd)	37,3614	0,00022 (5)	
XK β_3	(Nd)	42,167	}	K' β_1
XK β_1	(Nd)	42,2717		
XK β_5''	(Nd)	42,58		
XK β_2	(Nd)	43,335	}	K' β_2
XK β_4	(Nd)	43,451		
XKO _{2,3}	(Nd)	43,548		

		Energy (keV)	Photons (per 100 disint.)		
XL	(Pr)	4,453 - 6,617	10,5 (5)		
XK α_2	(Pr)	33,5506	8,66 (19)	}	K α
XK α_1	(Pr)	36,0267	15,8 (4)		
XK β_3	(Pr)	40,6533	4,81 (12)	}	K' β_1
XK β_1	(Pr)	40,7487			
XK β_5''	(Pr)	41,05			
XK β_2	(Pr)	41,774	1,23 (4)	}	K' β_2
XK β_4	(Pr)	41,877			
XKO $_{2,3}$	(Pr)	41,968			

5.2 Gamma Emissions

	Energy (keV)	Photons (per 100 disint.)
$\gamma_{1,0}(\text{Pr})$	59,03 (3)	0,0818 (12)
$\gamma_{2,1}(\text{Nd})$	618,107 (16)	0,030 (3)
$\gamma_{1,0}(\text{Nd})$	696,505 (4)	0,06 (2)
$\gamma_{3,1}(\text{Nd})$	814,308 (23)	0,02 (1)
$\gamma_{13,2}(\text{Nd})$	1631,36 (10)	0,030 (3)
$\gamma_{9,1}(\text{Nd})$	1885,75 (6)	0,010 (3)

6 Main Production Modes

U – 235(n,f)Pr – 144m

U – 238(n,f)Pr – 144m

Pu – 239(n,f)Pr – 144m

Ce – 144(β^-)Pr – 144m

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(Q-value)

γ Emission intensities
per 100 disintegrations



