$$^{219}_{86}\mathrm{Rn}_{133}$$

1 Decay Scheme

Rn-219 decays 100% by alpha-particle emission to various nuclear levels of Po-215.
Le radon 215 se désintègre par émissions alpha vers des niveaux excités du polonium 215.

2 Nuclear Data

$T_{1/2}(^{219}\mathrm{Rn})$	:	3,98	(3)	s
$T_{1/2}(^{215}\mathrm{Po})$	:	1,781	(4)	10^{-3} s
$Q^{\alpha}(^{219}\mathrm{Rn})$	:	6946,1	(3)	keV

2.1 α Transitions

	Energy keV	Probability × 100	F
$\alpha_{0,14}$	5851,9 (10)	0,00009 (5)	245
$\alpha_{0,13}$	5872,4 (5)	0,00094 (19)	33
$\alpha_{0,12}$	6016,1 (10)	0,00009 (5)	1590
$\alpha_{0,11}$	6055,0 (4)	0,0021 (3)	103
$\alpha_{0,10}$	6068,9 (7)	0,0003 (1)	830
$\alpha_{0,9}$	6110,8 (4)	0,0032 (5)	120
$\alpha_{0,8}$	6213,4 (5)	0,00123 (12)	880
$\alpha_{0,7}$	6238,0 (6)	0,00064 (12)	2170
$\alpha_{0,6}$	6269,4 (3)	0,0184 (22)	103
$\alpha_{0,5}$	6337,8 (3)	0,0043 (10)	860
$\alpha_{0,4}$	6428,5 (3)	0,048 (3)	184
$\alpha_{0,3}$	6544,3 (3)	7,85 (24)	3,31
$\alpha_{0,2}$	6652,5 (3)	0,098 (5)	710
$\alpha_{0,1}$	6674,9 (3)	12,6 (3)	6,75
$\alpha_{0,0}$	6946,1 (3)	79,4 (10)	11,2

2.2 Gamma Transitions and Internal Conversion Coefficients

	Energy keV	$P_{\gamma+ce}$ × 100	Multipolarity	α_K	α_L	α_M	α_T
$\gamma_{3,1}$(Po)	130,58 (1)	0,72 (6)	M1+26.5%E2	3,19 (16)	0,94 (4)	0,234 (10)	4,44 (13)
$\gamma_{4,2}$(Po)	224,04 (7)	0,0019 (3)	(E2)	0,1296 (19)	0,1407 (20)	0,0370 (6)	0,319 (5)
$\gamma_{1,0}$(Po)	271,228 (10)	13,30 (26)	M1+94%E2	0,111 (6)	0,0668 (11)	0,0173 (3)	0,201 (7)
$\gamma_{2,0}$(Po)	293,56 (4)	0,101 (4)	M1+50%E2	0,25 (4)	0,062 (4)	0,0152 (7)	0,34 (5)
$\gamma_{12,5}$(Po)	322 (1)	0,00009 (5)					
$\gamma_{8,3}$(Po)	330,9 (4)	0,00100 (11)					
$\gamma_{11,4}$(Po)	373,5 (3)	0,00025 (3)					
$\gamma_{6,2}$(Po)	383,1 (1)	0,00044 (7)					
$\gamma_{3,0}$(Po)	401,81 (1)	7,12 (23)	E2	0,0351 (5)	0,01528 (22)	0,00390 (6)	0,0555 (8)
$\gamma_{6,1}$(Po)	405,4 (1)	0,00025 (4)					
$\gamma_{7,1}$(Po)	436,9 (5)	0,00031 (6)					
$\gamma_{8,1}$(Po)	461,5 (4)	0,00017 (3)					
$\gamma_{11,3}$(Po)	489,3 (3)	0,00064 (9)					
$\gamma_{4,0}$(Po)	517,60 (6)	0,046 (4)	M1+50%E2	0,058 (9)	0,0115 (11)	0,00277 (24)	0,073 (10)
$\gamma_{13,4}$(Po)	556,1 (4)	0,00006 (4)	M1+50%E2	0,048 (7)	0,0095 (9)	0,00226 (21)	0,061 (8)
$\gamma_{9,1}$(Po)	564,1 (2)	0,0015 (3)					
$\gamma_{14,4}$(Po)	576,6 (10)	0,00009 (5)					
$\gamma_{5,0}$(Po)	608,30 (7)	0,0044 (10)	(M1+E2)				
$\gamma_{11,1}$(Po)	619,9 (3)	0,00033 (11)					
$\gamma_{(-1,1)}$(Po)	665,5 (10)	0,00009 (5)					
$\gamma_{13,3}$(Po)	671,9 (4)	0,00022 (11)	M1+E2				
$\gamma_{6,0}$(Po)	676,66 (7)	0,018 (2)					
$\gamma_{7,0}$(Po)	708,1 (5)	0,00033 (11)					
$\gamma_{8,0}$(Po)	732,7 (4)	0,00007 (4)					
$\gamma_{13,1}$(Po)	802,5 (4)	0,00033 (11)	M1+E2				
$\gamma_{9,0}$(Po)	835,32 (22)	0,0017 (3)					
$\gamma_{10,0}$(Po)	877,2 (6)	0,00033 (11)					
$\gamma_{11,0}$(Po)	891,1 (3)	0,0009 (2)					
$\gamma_{13,0}$(Po)	1073,7 (4)	0,00033 (11)	E2	0,00510 (8)	0,001002 (14)	0,000240 (4)	0,00641 (9)

3 Atomic Data

3.1 Po

ω_K : 0,965 (4)
$\bar{\omega}_L$: 0,403 (16)
n_{KL} : 0,807 (5)

3.1.1 X Radiations

		Energy keV		Relative probability
X_K				
	$K\alpha_2$	76,864		60
	$K\alpha_1$	79,293		100
	$K\beta_3$	89,256	}	
	$K\beta_1$	89,807	}	
	$K\beta_5''$	90,363	}	34
	$K\beta_2$	92,263	}	
	$K\beta_4$	92,618	}	10,7
	$KO_{2,3}$	92,983	}	
X_L				
	$L\ell$	9,658		
	$L\alpha$	11,016 – 11,13		
	$L\eta$	12,085		
	$L\beta$	12,823 – 13,778		
	$L\gamma$	15,742 – 16,213		

3.1.2 Auger Electrons

	Energy keV	Relative probability
Auger K		
KLL	58,978 – 65,205	100
KLX	71,902 – 79,289	56
KXY	84,8 – 93,1	7,8
Auger L	5,434 – 10,934	3660

4 α Emissions

	Energy keV	alpha per 100 disint.
$\alpha_{0,14}$	5745 (1)	0,00009 (5)
$\alpha_{0,13}$	5765,1 (5)	0,00094 (19)
$\alpha_{0,12}$	5906,2 (10)	0,00009 (5)
$\alpha_{0,11}$	5944,4 (4)	0,0021 (3)
$\alpha_{0,10}$	5958,1 (7)	0,0003 (1)
$\alpha_{0,9}$	5999,2 (4)	0,0032 (5)
$\alpha_{0,8}$	6099,9 (5)	0,00123 (12)
$\alpha_{0,7}$	6124,1 (6)	0,00064 (12)
$\alpha_{0,6}$	6154,9 (3)	0,0184 (22)
$\alpha_{0,5}$	6222,0 (3)	0,0043 (10)
$\alpha_{0,4}$	6311,1 (3)	0,048 (3)
$\alpha_{0,3}$	6424,8 (3)	7,85 (24)
$\alpha_{0,2}$	6531,0 (3)	0,098 (5)
$\alpha_{0,1}$	6553,0 (3)	12,6 (3)
$\alpha_{0,0}$	6819,2 (3)	79,4 (10)

5 Electron Emissions

		Energy keV	Electrons per 100 disint.
e_{AL}	(Po)	5,434 - 10,934	1,50 (5)
e_{AK}	(Po)		0,067 (9)
	KLL	58,978 - 65,205	}
	KLX	71,902 - 79,289	}
	KXY	84,8 - 93,1	}
$ec_{1,0\ T}$	(Po)	178,130 - 271,227	2,23 (4)
$ec_{1,0\ K}$	(Po)	178,13 (1)	1,23 (2)
$ec_{1,0\ L}$	(Po)	254,30 - 257,43	0,74 (2)
$ec_{1,0\ M}$	(Po)	267,08 - 268,55	0,19 (1)
$ec_{3,0\ K}$	(Po)	308,71 (1)	0,234 (8)
$ec_{3,0\ L}$	(Po)	384,88 - 388,00	0,102 (3)
$ec_{3,0\ M}$	(Po)	397,66 - 399,13	0,026 (1)

6 Photon Emissions

6.1 X-Ray Emissions

		Energy keV	Photons per 100 disint.	
XL	(Po)	9,658 — 16,213	1,01 (5)	
XKα_2	(Po)	76,864	0,540 (24)	} Kα
XKα_1	(Po)	79,293	0,90 (4)	}
XKβ_3	(Po)	89,256	}	
XKβ_1	(Po)	89,807	} 0,309 (15)	K$'\beta_1$
XKβ''_5	(Po)	90,363	}	
XKβ_2	(Po)	92,263	}	
XKβ_4	(Po)	92,618	} 0,096 (5)	K$'\beta_2$
XKO$_{2,3}$	(Po)	92,983	}	

6.2 Gamma Emissions

	Energy keV	Photons per 100 disint.
$\gamma_{3,1}$(Po)	130,58 (1)	0,133 (11)
$\gamma_{4,2}$(Po)	224,04 (7)	0,0014 (2)
$\gamma_{1,0}$(Po)	271,228 (10)	11,07 (22)
$\gamma_{2,0}$(Po)	293,56 (4)	0,075 (3)
$\gamma_{12,5}$(Po)	322 (1)	0,00009 (5)
$\gamma_{8,3}$(Po)	330,9 (4)	0,00100 (11)
$\gamma_{11,4}$(Po)	373,5 (3)	0,00025 (3)
$\gamma_{6,2}$(Po)	383,1 (1)	0,00044 (7)
$\gamma_{3,0}$(Po)	401,81 (1)	6,75 (22)
$\gamma_{6,1}$(Po)	405,4 (1)	0,00025 (4)
$\gamma_{7,1}$(Po)	436,9 (5)	0,00031 (6)
$\gamma_{8,1}$(Po)	461,5 (4)	0,00017 (3)
$\gamma_{11,3}$(Po)	489,3 (3)	0,00064 (9)
$\gamma_{4,0}$(Po)	517,60 (6)	0,043 (3)
$\gamma_{13,4}$(Po)	556,1 (4)	0,00006 (4)
$\gamma_{9,1}$(Po)	564,1 (2)	0,0015 (3)
$\gamma_{14,4}$(Po)	576,6 (10)	0,00009 (5)
$\gamma_{5,0}$(Po)	608,30 (7)	0,0044 (10)
$\gamma_{11,1}$(Po)	619,9 (3)	0,00033 (11)
$\gamma_{(-1,1)}$(Po)	665,5 (10)	0,00009 (5)
$\gamma_{13,3}$(Po)	671,9 (4)	0,00022 (11)
$\gamma_{6,0}$(Po)	676,66 (7)	0,018 (2)
$\gamma_{7,0}$(Po)	708,1 (5)	0,00033 (11)

	Energy keV	Photons per 100 disint.
$\gamma_{8,0}$(Po)	732,7 (4)	0,00007 (4)
$\gamma_{13,1}$(Po)	802,5 (4)	0,00033 (11)
$\gamma_{9,0}$(Po)	835,32 (22)	0,0017 (3)
$\gamma_{10,0}$(Po)	877,2 (6)	0,00033 (11)
$\gamma_{11,0}$(Po)	891,1 (3)	0,0009 (2)
$\gamma_{13,0}$(Po)	1073,7 (4)	0,00033 (11)

7 Main Production Modes

U − 235 (4n + 3) decay chain

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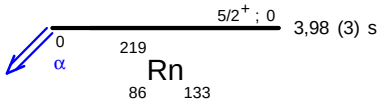
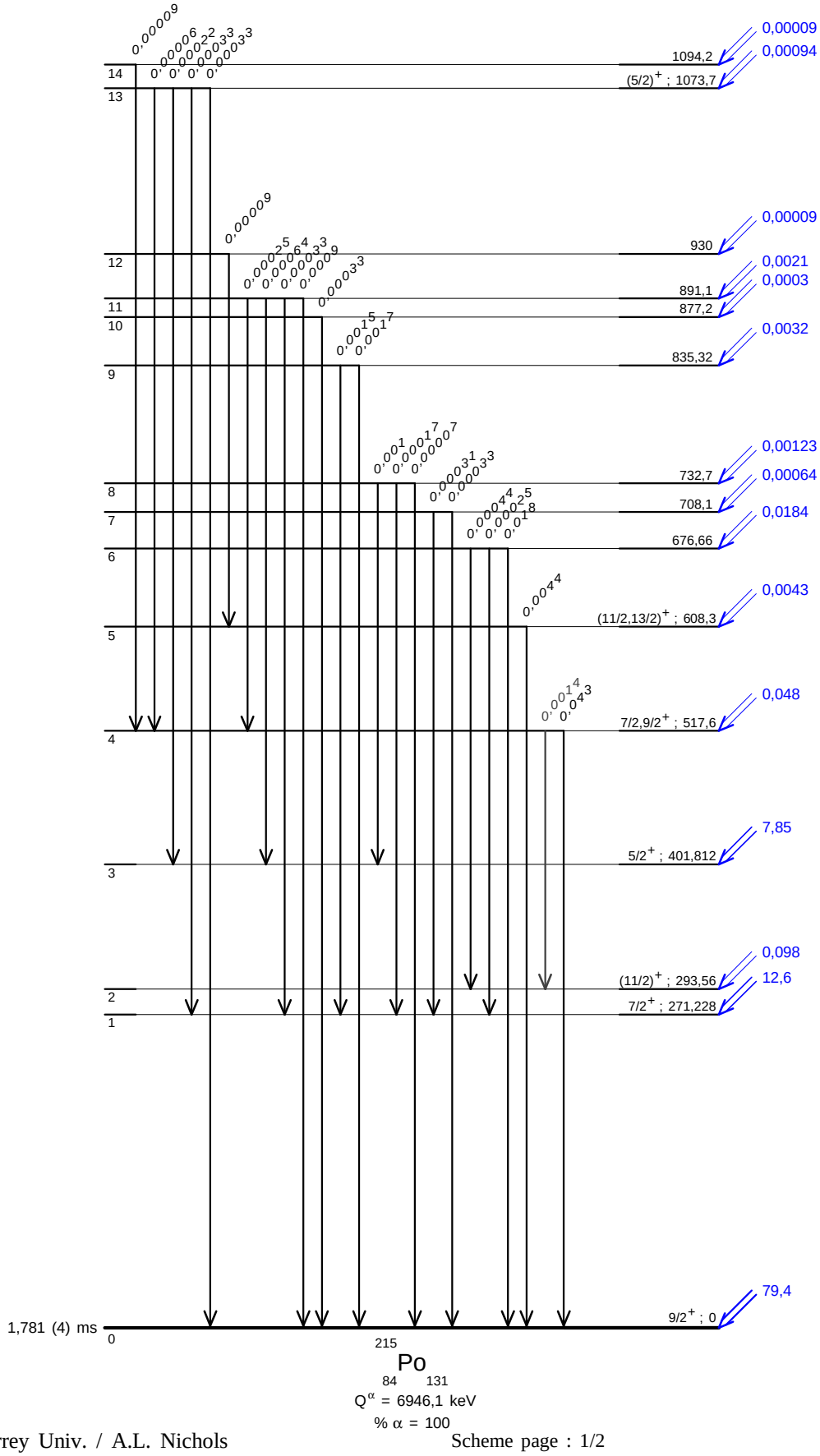
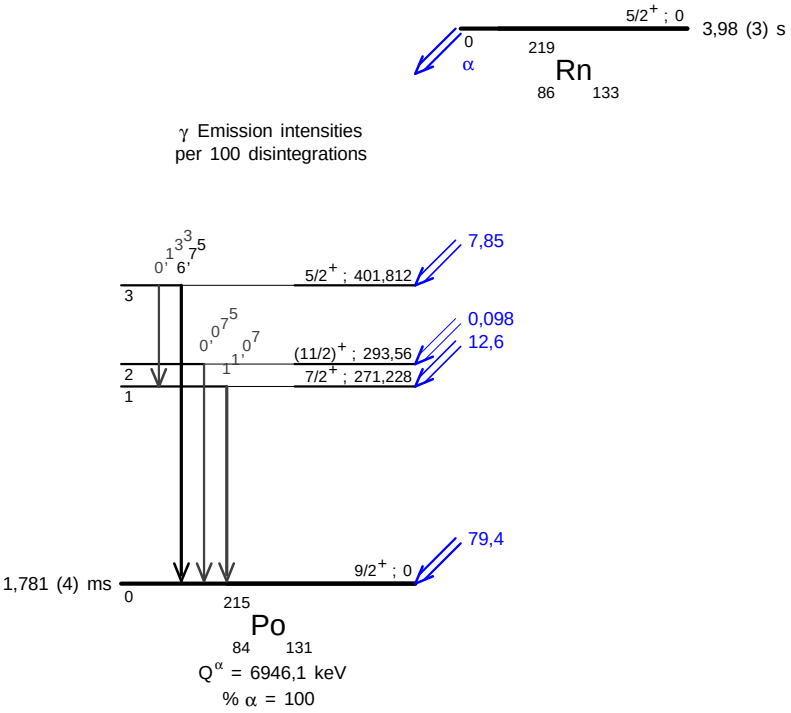
$^{219}_{86}Rn_{133}$



γ Emission intensities per 100 disintegrations




5/2+ ; 0
3,98 (3) s
0
α
219
Rn
86
133
γ Emission intensities
per 100 disintegrations
7,85
5/2+ ; 401,812
3
0,098
12,6
(11/2)+ ; 293,56
7/2+ ; 271,228
2
1
79,4
9/2+ ; 0
1,781 (4) ms
0
215
Po
84
131
Q^α = 6946,1 keV
% α = 100