$^{228}_{88}\mathrm{Ra}_{140}$

1 Decay Scheme

Ra-228 disintegrates 100 % by beta minus emissions to the excited states of Ac-228.
Le radium 228 se désintègre par émission bêta moins vers les niveaux excités de l'actinium 228.

2 Nuclear Data

$T_{1/2}(^{228}\mathrm{Ra}\ )$: 5,75 (4) a
$T_{1/2}(^{228}\mathrm{Ac}\ )$: 6,15 (3) h
$Q^{-}(^{228}\mathrm{Ra}\ )$: 45,8 (7) keV

2.1 β^- Transitions

	Energy keV	Probability × 100	Nature	lg ft
$\beta^-_{0,4}$	12,7 (7)	30 (10)	Allowed	5,11
$\beta^-_{0,3}$	25,6 (7)	8,7 (9)	1st Forbidden	6,2
$\beta^-_{0,2}$	39,1 (7)	49 (10)	Allowed	6,45
$\beta^-_{0,1}$	39,5 (7)	12 (10)	1st Forbidden	7,07

2.2 Gamma Transitions and Internal Conversion Coefficients

	Energy keV	$P_{\gamma+ce}$ × 100	Multipolarity	α_L	α_M	α_T
$\gamma_{1,0}$(Ac)	6,28 (3)	12 (10)	M2		4930000 (140000)	6680000 (190000)
$\gamma_{2,0}$(Ac)	6,67 (2)	89 (14)	E2		1172000 (24000)	1560000 (40000)
$\gamma_{4,3}$(Ac)	12,88 (11)	2,30 (46)	E1		5,11 (14)	6,67 (18)
$\gamma_{3,2}$(Ac)	13,520 (36)	11,0 (7)	E1		4,48 (7)	5,86 (10)
$\gamma_{4,2}$(Ac)	26,40 (11)	28 (10)	M1 + E2	151 (3)	37,2 (7)	201 (4)

3 Atomic Data

3.1 Ac

ω_K : 0,969 (4)
$\bar{\omega}_L$: 0,464 (18)
n_{KL} : 0,799 (5)

3.1.1 X Radiations

		Energy keV	Relative probability
X_L			
	Lℓ	10,8701	
	Lα	12,5002 – 12,6505	
	Lη	14,0807	
	Lβ	14,6024 – 16,6263	
	Lγ	17,813 – 18,9228	

3.1.2 Auger Electrons

	Energy keV	Relative probability
Auger L	5,87 – 19,67	

4 Electron Emissions

		Energy keV	Electrons per 100 disint.
e_{AL}	(Ac)	5,87 - 19,67	12 (5)
$ec_{1,0\ M}$	(Ac)	1,28 - 3,06	9 (7)
$ec_{2,0\ M}$	(Ac)	1,67 - 3,45	67 (11)
$ec_{1,0\ N}$	(Ac)	5,01 - 5,97	2,5 (21)
$ec_{2,0\ N}$	(Ac)	5,40 - 6,36	17,8 (28)
$ec_{4,2\ L}$	(Ac)	6,6 - 10,5	21 (8)
$ec_{4,3\ M}$	(Ac)	7,88 - 9,66	1,53 (31)
$ec_{3,2\ M}$	(Ac)	8,52 - 10,30	7,17 (46)
$ec_{4,3\ N}$	(Ac)	11,61 - 12,57	0,39 (8)
$ec_{3,2\ N}$	(Ac)	12,25 - 13,21	1,82 (12)
$ec_{4,2\ M}$	(Ac)	21,4 - 23,2	5,2 (19)
$ec_{4,2\ N}$	(Ac)	25,1 - 26,1	1,38 (49)
$\beta^-_{0,4}$	max:	12,7 (7)	30 (10)
$\beta^-_{0,3}$	max:	25,6 (7)	8,7 (9)
$\beta^-_{0,2}$	max:	39,1 (7)	49 (10)
$\beta^-_{0,1}$	max:	39,5 (7)	12 (10)

5 Photon Emissions

5.1 X-Ray Emissions

		Energy keV	Photons per 100 disint.
XL	(Ac)	10,8701 — 18,9228	9,6 (19)

5.2 Gamma Emissions

	Energy keV	Photons per 100 disint.
$\gamma_{1,0}$(Ac)	6,28 (3)	0,0000018 (15)
$\gamma_{2,0}$(Ac)	6,67 (2)	0,000057 (9)
$\gamma_{4,3}$(Ac)	12,88 (11)	0,30 (6)
$\gamma_{3,2}$(Ac)	13,520 (36)	1,6 (1)
$\gamma_{4,2}$(Ac)	26,40 (11)	0,14 (5)

6 Main Production Modes

$\mathrm{Th}-232(\alpha)\mathrm{Ra}-228$

7 References

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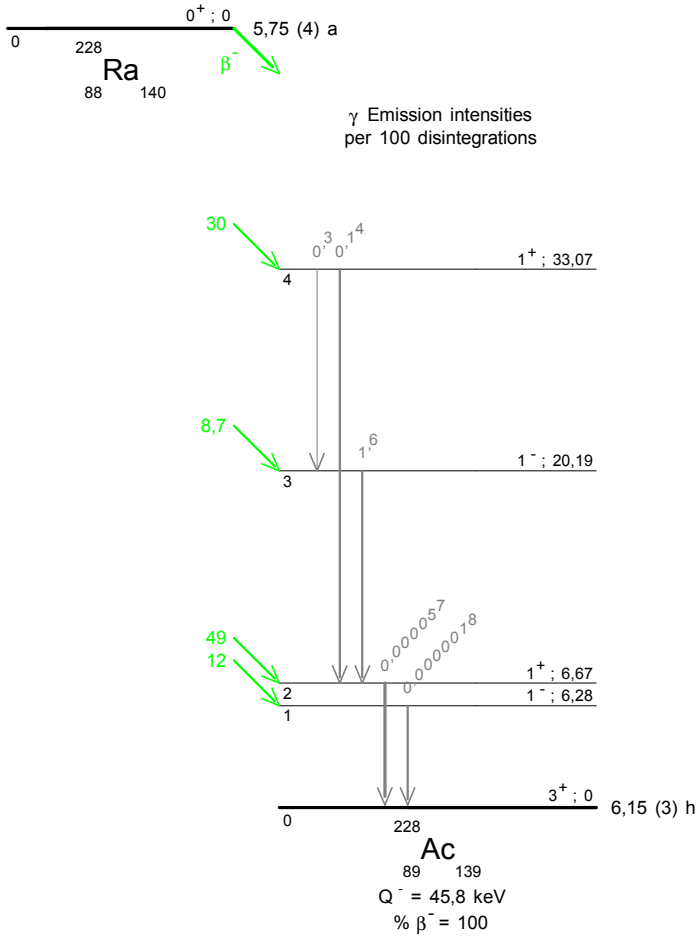
0+ ; 0
5,75 (4) a
0
228
Ra
88
140
β-
γ Emission intensities
per 100 disintegrations
30
0,3
0,14
1+ ; 33,07
4
8,7
1,6
1- ; 20,19
3
49
12
0,000057
0,000018
1+ ; 6,67
1- ; 6,28
2
1
3+ ; 0
6,15 (3) h
0
228
Ac
89
139
Q- = 45,8 keV
% β- = 100