$$^{52}_{25}\mathrm{Mn}_{27}$$

1 Decay Scheme

Mn-52 decays via electron capture and beta plus to various excited levels in Cr-52.
Le Mn-52 se désintègre par capture électronique et par bêta plus vers plusieurs niveaux excités du Cr-52.

2 Nuclear Data

$T_{1/2}(^{52}\mathrm{Mn})$	:	5,592	(3)	d
$Q^{+}(^{52}\mathrm{Mn})$	:	4712,0	(19)	keV

2.1 Electron Capture Transitions

	Energy (keV)	Probability (%)	Nature	lg ft	P_K	P_L	P_M
$\epsilon_{0,8}$	84,9 (19)	0,0027 (6)	2nd Forbidden	5,73	0,797 (6)	0,175 (5)	0,0262 (8)
$\epsilon_{0,7}$	696,5 (19)	1,07 (5)	Allowed	6,587	0,88463 (34)	0,09883 (23)	0,01538 (9)
$\epsilon_{0,6}$	1096,1 (19)	7,67 (6)	Allowed	6,13	0,88519 (34)	0,09835 (23)	0,01529 (9)
$\epsilon_{0,5}$	1296,7 (19)	0,025 (38)	2nd Forbidden	9,6	0,88429 (35)	0,09913 (24)	0,01542 (9)
$\epsilon_{0,4}$	1598,1 (19)	59,9 (7)	Allowed	5,6	0,88550 (34)	0,09810 (23)	0,01525 (9)
$\epsilon_{0,3}$	1944,2 (19)	0,02 (7)	2nd Forbidden	10,4	0,88496 (34)	0,09855 (23)	0,01532 (9)
$\epsilon_{0,2}$	2342,3 (19)	0,2 (6)	2nd Forbidden	9,8	0,88518 (34)	0,09837 (23)	0,01529 (9)

2.2 β^{+} Transitions

	Energy (keV)	Probability (%)	Nature	lg ft
$\beta^{+}_{0,6}$	74,1 (19)	0,00133 (17)	Allowed	6,13
$\beta^{+}_{0,5}$	274,7 (19)	0,00009 (13)	2nd Forbidden	9,6
$\beta^{+}_{0,4}$	576,1 (19)	30,85 (43)	Allowed	5,6
$\beta^{+}_{0,3}$	922,2 (19)	0,011 (26)	2nd Forbidden	10,4
$\beta^{+}_{0,2}$	1320,3 (19)	0,3 (6)	2nd Forbidden	9,8

2.3 Gamma Transitions and Internal Conversion Coefficients

	Energy (keV)	$P_{\gamma+ce}$ (%)	Multipolarity	α_K (10^{-3})	α_L (10^{-4})	α_M (10^{-5})	α_T (10^{-3})	α_π (10^{-5})
$\gamma_{6,5}$(Cr)	200,580 (38)	0,0772 (22)	M1+E2	15 (11)	14 (11)	18 (14)	16 (12)	
$\gamma_{4,3}$(Cr)	346,030 (33)	0,988 (31)	E2	3,43 (5)	3,23 (5)	4,24 (6)	3,79 (6)	
$\gamma_{3,2}$(Cr)	398,090 (31)	0,089 (6)	M1+E2	1,4 (7)	1,4 (7)	1,8 (9)	1,6 (8)	
$\gamma_{7,6}$(Cr)	399,542 (47)	0,182 (6)	M1+E2	1,4 (7)	1,3 (7)	1,8 (9)	1,6 (8)	
$\gamma_{6,4}$(Cr)	501,970 (34)	0,185 (25)	M1+E2	0,7 (3)	0,67 (25)	0,9 (4)	0,8 (3)	
$\gamma_{7,5}$(Cr)	600,42 (5)	0,414 (29)	M1+E2	0,44 (13)	0,41 (12)	0,54 (16)	0,48 (14)	
$\gamma_{5,3}$(Cr)	647,541 (38)	0,410 (14)	M1+E2	0,27 (18)	0,25 (17)	0,32 (23)	0,29 (20)	
$\gamma_{4,2}$(Cr)	744,219 (32)	90,0 (8)	E2	0,302 (5)	0,281 (4)	0,370 (6)	0,334 (5)	
$\gamma_{6,3}$(Cr)	848,141 (33)	3,361 (3)	M1+E2	0,18 (3)	0,17 (3)	0,22 (4)	0,20 (4)	
$\gamma_{7,4}$(Cr)	901,880 (47)	0,044 (4)	M1+E2	0,158 (24)	0,147 (23)	0,19 (3)	0,17 (3)	
$\gamma_{2,1}$(Cr)	935,528 (27)	94,904 (30)	E2	0,1658 (24)	0,1536 (22)	0,202 (3)	0,183 (3)	
$\gamma_{5,2}$(Cr)	1045,730 (37)	0,07 (2)	M1+E2	0,113 (13)	0,105 (13)	0,138 (16)	0,125 (15)	
$\gamma_{6,2}$(Cr)	1246,380 (32)	4,229 (40)	M1+E2	0,078 (7)	0,072 (7)	0,095 (8)	0,101 (10)	1,5 (3)
$\gamma_{7,3}$(Cr)	1247,830 (46)	0,38 (4)	M1+E2	0,078 (7)	0,072 (6)	0,095 (8)	0,101 (10)	1,5 (3)
$\gamma_{3,1}$(Cr)	1333,632 (29)	5,08 (3)	E2	0,0731 (11)	0,0674 (10)	0,0887 (13)	0,1175 (17)	3,68 (6)
$\gamma_{1,0}$(Cr)	1434,080 (17)	100,0000 (19)	E2	0,0627 (9)	0,0578 (8)	0,0760 (11)	0,1340 (19)	6,47 (9)
$\gamma_{7,2}$(Cr)	1645,809 (45)	0,050 (3)	M1+E2	0,0453 (23)	0,0417 (22)	0,055 (3)	0,181 (20)	13,1 (18)
$\gamma_{5,1}$(Cr)	1981,110 (34)	0,035 (3)	E2	0,0334 (5)	0,0307 (5)	0,0404 (6)	0,341 (5)	30,4 (5)
$\gamma_{8,2}$(Cr)	2257,41 (20)	0,0027 (6)	M1+E2	0,0257 (8)	0,0236 (8)	0,0311 (10)	0,43 (4)	40 (4)

3 Atomic Data

3.1 Cr

ω_K	:	0,289	(5)
$\bar{\omega}_L$	:	0,0045	(9)
n_{KL}	:	1,508	(5)

3.1.1 X Radiations

		Energy (keV)	Relative probability
X_K			
	$K\alpha_2$	5,40557	50,91
	$K\alpha_1$	5,41479	100
	$K\beta_1$	5,94677	20,31249
	$K\beta_5''$	5,987	
X_L			
	$L\ell$	0,5003	
	$L\alpha$	0,5729 - 0,57695	
	$L\eta$	0,5102	
	$L\beta$	0,57515 - 0,69748	
	$L\gamma$	0,58496 - 0,58496	

3.1.2 Auger Electrons

	Energy (keV)	Relative probability
Auger K		
KLL	4,554 - 4,794	100
KLX	5,206 - 5,412	26,9
KXY	5,841 - 5,985	1,81
Auger L	0,4263 - 0,6920	

4 Electron Emissions

		Energy (keV)		Electrons (per 100 disint.)
e_{AL}	(Cr)	0,4263 - 0,6920		6,74 (10)
e_{AK}	(Cr)			
	KLL	4,554 - 4,794		43,4 (7)
	KLX	5,206 - 5,412		
	KXY	5,841 - 5,985		
$ec_{6,5\ T}$	(Cr)	194,59 - 200,58		0,0012 (9)
$ec_{4,3\ T}$	(Cr)	340,04 - 346,03		0,00373 (13)
$ec_{3,2\ T}$	(Cr)	392,10 - 398,09		0,00014 (7)
$ec_{7,6\ T}$	(Cr)	393,553 - 399,542		0,00029 (15)
$ec_{6,4\ T}$	(Cr)	495,98 - 501,97		0,00015 (6)
$ec_{7,5\ T}$	(Cr)	594,43 - 600,42		0,00020 (6)
$ec_{5,3\ T}$	(Cr)	641,552 - 647,541		0,00012 (8)
$ec_{4,2\ T}$	(Cr)	738,230 - 744,219		0,0301 (5)
$ec_{6,3\ T}$	(Cr)	842,152 - 848,141		0,00067 (13)
$ec_{2,1\ T}$	(Cr)	929,539 - 935,528		0,01736 (28)
$ec_{6,2\ T}$	(Cr)	1240,39 - 1246,38		0,000427 (42)
$ec_{3,1\ T}$	(Cr)	1327,643 - 1333,632		0,000597 (9)
$ec_{1,0\ T}$	(Cr)	1428,09 - 1434,08		0,01340 (19)
$\beta^+_{0,6}$	max:	74,1	(19)	0,00133 (17)
	avg:	34,1	(8)	
$\beta^+_{0,4}$	max:	576,1	(19)	30,85 (43)
	avg:	241,6	(8)	
$\beta^+_{0,5}$	max:	274,7	(19)	0,00009 (13)
	avg:	132,2	(9)	
$\beta^+_{0,3}$	max:	922,2	(19)	0,011 (26)
	avg:	418,1	(8)	
$\beta^+_{0,2}$	max:	1320,3	(19)	0,3 (6)
	avg:	594,5	(8)	

5 Photon Emissions

5.1 X-Ray Emissions

		Energy (keV)	Photons (per 100 disint.)	
XL	(Cr)	0,5003 - 0,69748	0,030 (7)	
XKα_2	(Cr)	5,40557	5,25 (12)	} Kα
XKα_1	(Cr)	5,41479	10,30 (23)	}
XKβ_1	(Cr)	5,94677 }	2,09 (5)	K$'\beta_1$
XKβ_5''	(Cr)	5,987 }		K$'\beta_2$

5.2 Gamma Emissions

	Energy (keV)	Photons (per 100 disint.)
$\gamma_{6,5}$(Cr)	200,58 (4)	0,076 (2)
$\gamma_{4,3}$(Cr)	346,03 (3)	0,984 (31)
$\gamma_{3,2}$(Cr)	398,09 (9)	0,089 (6)
$\gamma_{7,6}$(Cr)	399,542 (19)	0,182 (6)
$\gamma_{6,4}$(Cr)	501,97 (8)	0,185 (25)
$\gamma^{\pm}$	511	62,3 (15)
$\gamma_{7,5}$(Cr)	600,42 (23)	0,414 (29)
$\gamma_{5,3}$(Cr)	647,537 (30)	0,410 (14)
$\gamma_{4,2}$(Cr)	744,213 (6)	90,0 (8)
$\gamma_{6,3}$(Cr)	848,134 (26)	3,36 (3)
$\gamma_{7,4}$(Cr)	901,87 (18)	0,044 (4)
$\gamma_{2,1}$(Cr)	935,519 (10)	94,887 (30)
$\gamma_{5,2}$(Cr)	1045,72 (8)	0,07 (2)
$\gamma_{6,2}$(Cr)	1246,36 (12)	4,229 (40)
$\gamma_{7,3}$(Cr)	1247,81 (12)	0,38 (4)
$\gamma_{3,1}$(Cr)	1333,614 (11)	5,079 (30)
$\gamma_{1,0}$(Cr)	1434,060 (15)	99,9866 (19)
$\gamma_{7,2}$(Cr)	1645,781 (29)	0,050 (3)
$\gamma_{5,1}$(Cr)	1981,07 (3)	0,035 (3)
$\gamma_{8,2}$(Cr)	2257,36 (19)	0,0027 (6)

6 Main Production Modes

$\mathrm{Cr}-52(\mathrm{d,2n})\mathrm{Mn}-52 \qquad \sigma : 0{,}15$ barns

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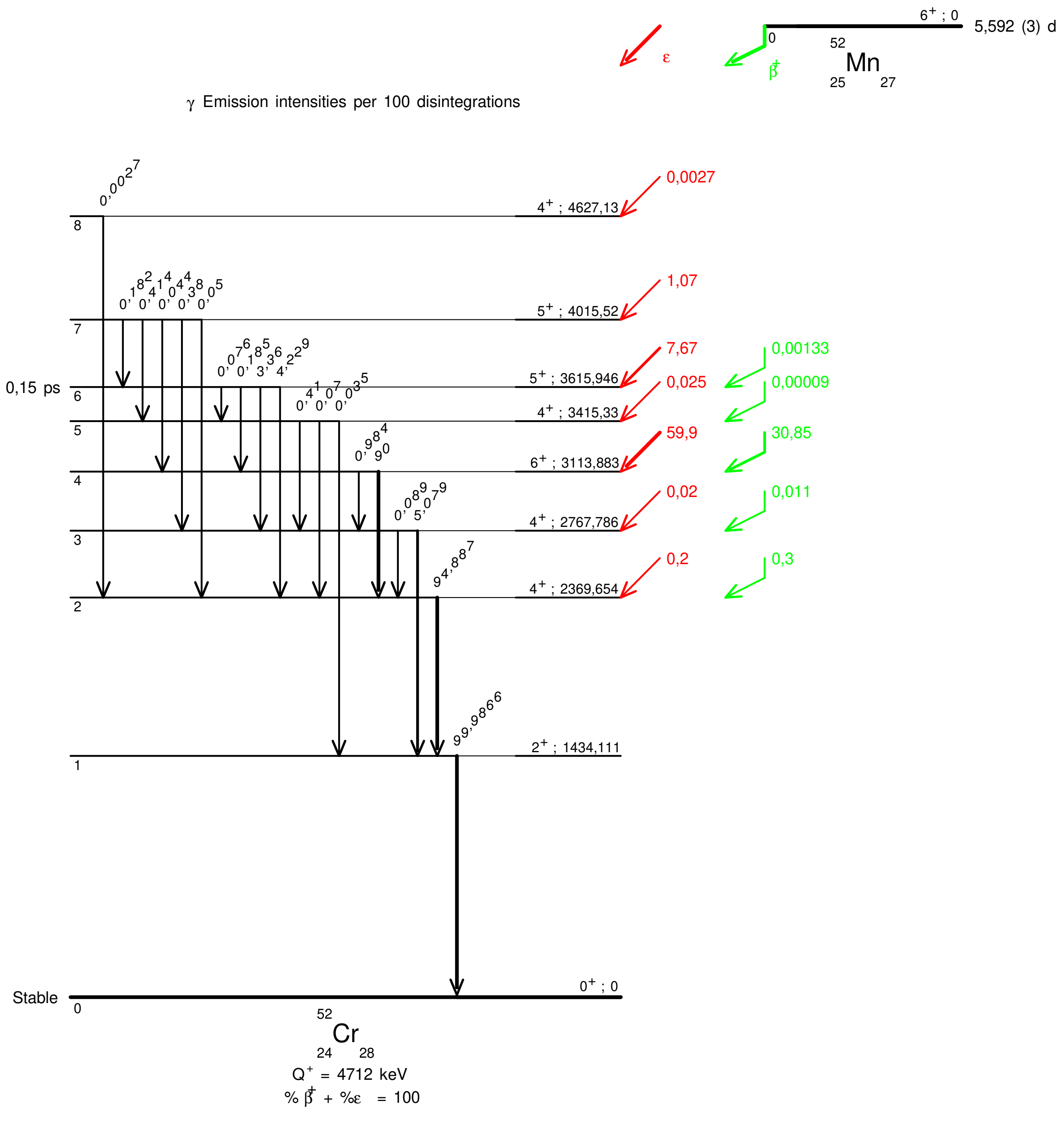
6+ ; 0
5,592 (3) d
ε
β+
0
52
Mn
25 27
γ Emission intensities per 100 disintegrations
4+ ; 4627,13
0,0027
5+ ; 4015,52
1,07
5+ ; 3615,946
7,67
0,00133
4+ ; 3415,33
0,025
0,00009
6+ ; 3113,883
59,9
30,85
4+ ; 2767,786
0,02
0,011
4+ ; 2369,654
0,2
0,3
2+ ; 1434,111
0+ ; 0
0,15 ps
Stable
52
Cr
24 28
Q+ = 4712 keV
% β+ + %ε = 100