$^{56}_{25}$Mn $_{31}$

1 Decay Scheme

Mn-56 decays by beta minus emission to excited levels of Fe-56.
Le manganèse 56 se désintègre par émission bêta moins vers les niveaux excités du fer 56.

2 Nuclear Data

$T_{1/2}$(^{56}Mn)	:	2,57878	(46)	h
Q^-(^{56}Mn)	:	3695,5	(3)	keV

2.1 β^- Transitions

	Energy keV	Probability × 100	Nature	lg ft
$\beta^-_{0,7}$	250,2 (3)	0,020 (2)	Allowed	6,57
$\beta^-_{0,6}$	325,7 (3)	1,20 (3)	Allowed	5,17
$\beta^-_{0,5}$	572,6 (3)	0,040 (4)	Allowed	7,5
$\beta^-_{0,4}$	735,6 (3)	14,5 (3)	Allowed	5,34
$\beta^-_{0,3}$	1037,9 (3)	27,5 (4)	Allowed	5,621
$\beta^-_{0,2}$	1610,4 (3)	0,057 (6)	Allowed	9,06
$\beta^-_{0,1}$	2848,7 (3)	56,6 (7)	Allowed	7,101

2.2 Gamma Transitions and Internal Conversion Coefficients

	Energy keV	$P_{\gamma+ce}$ × 100	Multipolarity	α_K	α_L	α_M+	α_T
$\gamma_{1,0}$(Fe)	846,776 (5)	98,88 (3)	E2	0,000270 (8)	0,0000250 (8)	0,0000037 (1)	0,000300 (9)
$\gamma_{5,2}$(Fe)	1037,85 (2)	0,040 (4)	M1+0.04%E2	0,000130 (4)	0,0000120 (4)	0,0000060 (2)	0,0001500 (45)
$\gamma_{2,1}$(Fe)	1238,300 (12)	0,097 (2)	E2	0,000110 (3)	0,0000100 (3)	0,00000200 (6)	0,000120 (4)
$\gamma_{3,1}$(Fe)	1810,786 (15)	26,9 (4)	M1+3%E2	0,0000460 (14)	0,00000430 (13)	0,00000063 (2)	0,0000510 (15)
$\gamma_{4,1}$(Fe)	2113,15 (1)	14,2 (3)	M1+4%E2				

	Energy keV	$P_{\gamma+ce}$ × 100	Multipolarity	α_K	α_L	α_M+	α_T
$\gamma_{6,1}$(Fe)	2523,06 (5)	1,02 (2)	M1+E2				
$\gamma_{7,1}$(Fe)	2598,53 (2)	0,020 (2)	M1+E2				
$\gamma_{3,0}$(Fe)	2657,56 (1)	0,645 (7)	E2				
$\gamma_{4,0}$(Fe)	2959,92 (1)	0,307 (5)	E2				
$\gamma_{6,0}$(Fe)	3369,84 (4)	0,17 (1)	E2				

3 Atomic Data

3.1 Fe

ω_K	:	0,355	(4)
$\bar{\omega}_L$	:	0,0060	(6)
n_{KL}	:	1,447	(4)

3.1.1 X Radiations

		Energy keV		Relative probability
X_K				
	$K\alpha_2$	6,39091		51
	$K\alpha_1$	6,40391		100
	$K\beta_1$	7,05804	}	
	$K\beta_5''$	7,1083	}	20,6

3.1.2 Auger Electrons

		Energy keV	Relative probability
Auger K			
	KLL	5,370 – 5,645	100
	KLX	6,158 – 6,400	27,4
	KXY	6,926 – 7,105	1,87
Auger L		0,510 – 0,594	307

4 Electron Emissions

		Energy keV		Electrons per 100 disint.
e_{AL}	(Fe)	0,510 - 0,594		0,0428 (3)
e_{AK}	(Fe)			0,0180 (1)
	KLL	5,370 - 5,645	}	
	KLX	6,158 - 6,400	}	
	KXY	6,926 - 7,105	}	
$\beta^-_{0,7}$	max:	250,2	(3)	0,020 (2)
$\beta^-_{0,7}$	avg:	73,5	(1)	
$\beta^-_{0,6}$	max:	325,7	(3)	1,20 (3)
$\beta^-_{0,6}$	avg:	99,1	(1)	
$\beta^-_{0,5}$	max:	572,6	(3)	0,040 (4)
$\beta^-_{0,5}$	avg:	190,4	(2)	
$\beta^-_{0,4}$	max:	735,6	(3)	14,5 (3)
$\beta^-_{0,4}$	avg:	255,2	(2)	
$\beta^-_{0,3}$	max:	1037,9	(3)	27,5 (4)
$\beta^-_{0,3}$	avg:	381,9	(2)	
$\beta^-_{0,2}$	max:	1610,4	(3)	0,057 (6)
$\beta^-_{0,2}$	avg:	636,3	(2)	
$\beta^-_{0,1}$	max:	2848,7	(3)	56,6 (7)
$\beta^-_{0,1}$	avg:	1216,8	(2)	

5 Photon Emissions

5.1 X-Ray Emissions

		Energy keV		Photons per 100 disint.	
$XK\alpha_2$	(Fe)	6,39091		0,00295 (4)	} $K\alpha$
$XK\alpha_1$	(Fe)	6,40391		0,00578 (7)	}
$XK\beta_1$	(Fe)	7,05804	}	0,00119 (2)	$K'\beta_1$
$XK\beta''_5$	(Fe)	7,1083	}		

5.2 Gamma Emissions

	Energy keV	Photons per 100 disint.
$\gamma_{1,0}$(Fe)	846,7638 (19)	98,85 (3)
$\gamma_{5,2}$(Fe)	1037,8333 (24)	0,040 (4)
$\gamma_{2,1}$(Fe)	1238,2736 (22)	0,097 (2)
$\gamma_{3,1}$(Fe)	1810,726 (4)	26,9 (4)
$\gamma_{4,1}$(Fe)	2113,092 (6)	14,2 (3)
$\gamma_{6,1}$(Fe)	2523,06 (5)	1,02 (2)
$\gamma_{7,1}$(Fe)	2598,438 (4)	0,020 (2)
$\gamma_{3,0}$(Fe)	2657,56 (1)	0,645 (7)
$\gamma_{4,0}$(Fe)	2959,92 (1)	0,307 (5)
$\gamma_{6,0}$(Fe)	3369,84 (4)	0,17 (1)

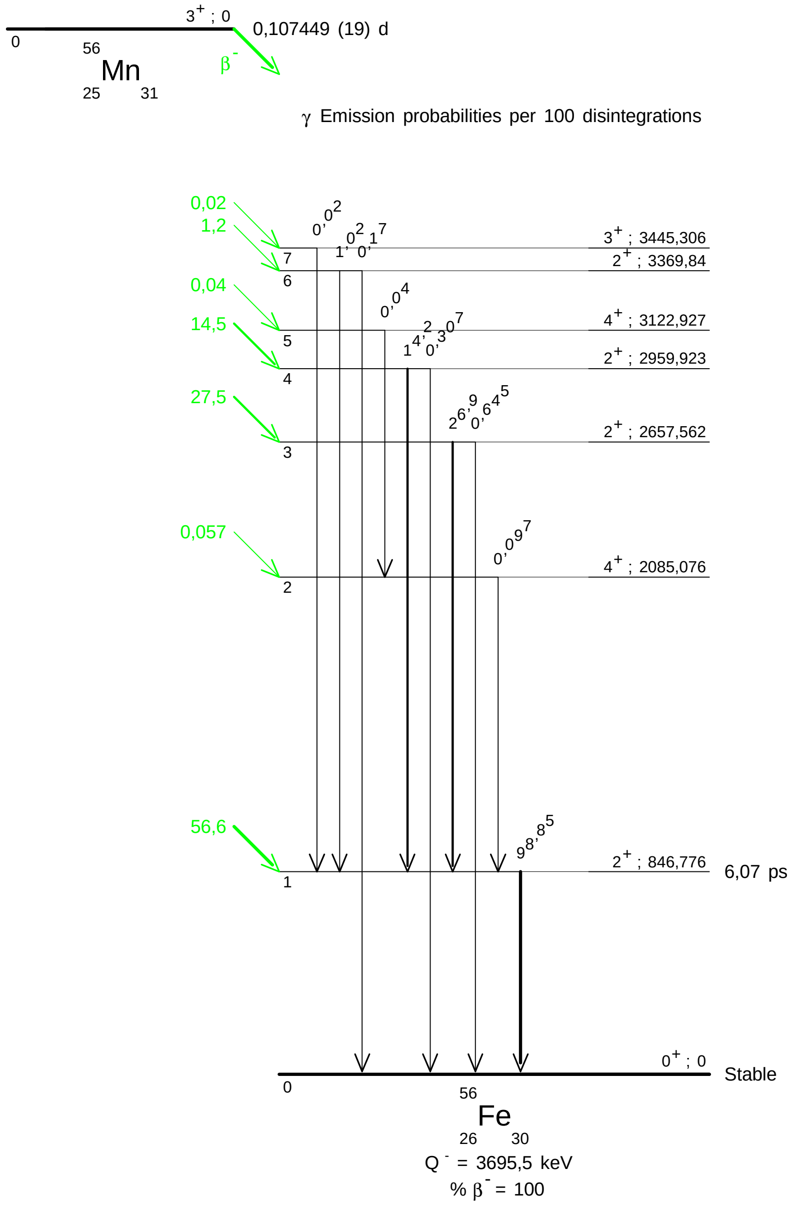
6 Main Production Modes

Cr – 56(β^-)Mn – 56
Mn – 55(n,γ)Mn – 56
Mn – 55(d,p)Mn – 56
Fe – 58(d,α)Mn – 56

7 References

- R. L. Auble, W. C. McHarris, W. H. Kelly. Nucl. Phys. A91 (1967) 225
  (Gamma-ray emission probabilities)
- A. H. Sher, B. D. Pate. Nucl. Phys. A112 (1968) 85
  (Half-life, Gamma-ray emission probabilities)
- I. W. Goodier, M. J. Woods, A. Williams. Proc. Int. Conf. Chemical Nucl. Data, Canterbury, Editor: M. L. Hurrell (1971) 175
  (Half-life)
- J. F. Emery, S. A. Reynolds, E. I. Wyatt, G. I. Gleason. Nucl. Sci. Eng. 48 (1972) 319
  (Half-life)
- F. Lagoutine, J. Legrand. Nucl. Instrum. Methods 112 (1973) 323
  (Half-life)
- G. Ardisson, C. Marsol. Nucl. Phys. A212 (1973) 424
  (Gamma-ray emission probabilities)
- S. Hoffmann. Z. Phys. 270 (1974) 133
  (Gamma-ray emission probabilities)
- K. G. Tirsell, L. G. Multhauf, S. Raman. Phys. Rev. C10 (1974) 785
  (Gamma-ray emission probabilities)
- I. M. Band, M. B. Trzhaskovskaya, M. A. Listengarten. At. Data Nucl. Data Tables 18 (1976) 433
  (Internal conversion coefficients)
- A. R. Rutledge, L. V. Smith, J. S. Merritt. Report AECL-6692 (1980)
  (Half-life)
- S. P. Collins, S. A. Eid, S. A. Hamada, W. D. Hamilton, F. Hoyler. J. Phys. G: Nucl. Part. Phys. 15 (1989) 321
  (Multipolarity)
- M. S. Antony, D. Oster, A. Hachem. J. Radioanal. Nucl. Chem. Letts 164 (1992) 303
  (Half-life)

- T. Yassine, I. Othman. Appl. Rad. Isotopes 45 (1994) 271
  (Half-life)
- G. Audi, A. H. Wapstra. Nucl. Phys. A595 (1995) 409
  (Q value)
- E. Schönfeld, H. Janssen. Nucl. Instrum. Methods Phys. Res. A369 (1996) 527
  (K x-ray, L x-ray, Auger electrons)
- B. Singh, J. L. Rodriguez, S. S. M. Wong, J. K. Tuli. Nucl. Data Sheets 84 (1998) 487
  (log ft)
- E. Schönfeld, G. Rodloff. Report PTB-6.11-98-1 (1998)
  (Auger electrons)
- Huo Junde. Nucl. Data Sheets 86 (1999) 315
  (Nuclear structure, energies)
- E. Schönfeld, G. Rodloff. Report PTB-6.11-1999-1 (1999)
  (K x-ray)
- R.G. Helmer, C. van der Leun. Nucl. Instrum. Methods Phys. Res. A450 (2000) 35
  (Gamma-ray energies)
- T.D. MacMahon, A. Pearce, P. Harris. Appl. Rad. Isotopes 60 (2004) 275
  (Statistical analyses)
- M.J. Woods. IAEA TECDOC (2004)
  (Half-life evaluation)
- H. Miyahara, Y. Ogata, K. Fujiki, K. Katoh, N. Marnada. Appl. Rad. Isotopes 60 (2004) 295
  (Gamma-ray emission probabilities)


3+ ; 0
0,107449 (19) d
0
56 Mn 25 31
β-
γ Emission probabilities per 100 disintegrations
0,02
1,2
0,04
14,5
27,5
0,057
56,6
7
6
5
4
3
2
1
0
3+ ; 3445,306
2+ ; 3369,84
4+ ; 3122,927
2+ ; 2959,923
2+ ; 2657,562
4+ ; 2085,076
2+ ; 846,776
6,07 ps
0+ ; 0
Stable
56 Fe 26 30
Q - = 3695,5 keV
% β- = 100