



1 Decay Scheme

Fe-55 disintegrates by electron capture. A gamma transition with a small probability ($1,3 \times 10^{-7}$ %) has been observed. A background radiation, due to an inner-bremsstrahlung, with an intensity relative to K capture of $3,24(6) \times 10^{-5}$ photons produces a continuous spectrum up to 231,21 keV.

Le Fe-55 se désintègre par capture électronique. Une transition gamma de faible probabilité a été observée. Un rayonnement de freinage interne produit une émission radiative, dont la probabilité relative à la capture électronique K est de $3,24(6) \times 10^{-5}$.

2 Nuclear Data

$$T_{1/2}({}^{55}\text{Fe}) : 2,747 \quad (8) \quad \text{a}$$

$$Q^+({}^{55}\text{Fe}) : 231,21 \quad (18) \quad \text{keV}$$

2.1 Electron Capture Transitions

	Energy keV	Probability $\times 100$	Nature	lg <i>ft</i>	P_K	P_L	P_{M+}
$\epsilon_{0,1}$	105,26 (18)	0,00000013 (1)	2nd Forbidden	14,2			
$\epsilon_{0,0}$	231,21 (18)	100	Allowed	6	0,8853 (16)	0,0983 (13)	0,0163 (8)

2.2 Gamma Transitions and Internal Conversion Coefficients

	Energy keV	$P_{\gamma+ce}$ $\times 100$	Multipolarity
$\gamma_{1,0}(\text{Mn})$	125,949 (10)	0,00000013 (1)	M1+(E2)

3 Atomic Data

3.1 Mn

ω_K	:	0,321	(7)
$\bar{\omega}_L$:	0,0047	(7)
$\bar{\omega}_M$:	0,000027	(2)
n_{KL}	:	1,478	(4)
\bar{n}_{LM}	:	1,996	(8)

3.1.1 X Radiations

		Energy keV		Relative probability
X _K	K α_2	5,88765		51
	K α_1	5,89875		100
	K β_3	6,49045	}	20,5
	K β_5''	6,5352	}	
	X _L	L ℓ	0,556	
L η		0,567		
L β		0,649 – 0,721		

3.1.2 Auger Electrons

	Energy keV	Relative probability
Auger K		
KLL	4,953 – 5,210	100
KLX	5,671 – 5,895	27,2
KXY	6,370 – 6,532	1,85
Auger L	0,47 – 0,67	

4 Electron Emissions

		Energy keV	Electrons per 100 disint.
e _{AL}	(Mn)	0,47 - 0,67	140,2 (8)
e _{AK}	(Mn)		60,1 (5)
	KLL	4,953 - 5,210	}
	KLX	5,671 - 5,895	}
	KXY	6,370 - 6,532	}

5 Photon Emissions

5.1 X-Ray Emissions

		Energy keV	Photons per 100 disint.	
XL	(Mn)	0,556 — 0,721	0,524 (21)	
XK α_2	(Mn)	5,88765	8,45 (14)	} K α
XK α_1	(Mn)	5,89875	16,57 (27)	}
XK β_3	(Mn)	6,49045	}	
XK β_1	(Mn)		}	
XK β_5''	(Mn)	6,5352	}	3,40 (7) K' β_1
XK β_4	(Mn)		}	K' β_2

5.2 Gamma Emissions

		Energy keV	Photons per 100 disint.
$\gamma_{1,0}$ (Mn)	125,949 (10)	0,00000013 (1)	

6 Main Production Modes

$$\left\{ \begin{array}{l} \text{Fe} - 54(n,\gamma)\text{Fe} - 55 \quad \sigma : 2,25 (1800) \text{ barns} \\ \text{Possible impurities : Fe} - 59 \\ \text{Mn} - 55(p,n)\text{Fe} - 55 \\ \text{Fe} - 54(d,p)\text{Fe} - 55 \\ \text{Possible impurities : Co} - 55 \end{array} \right.$$

7 References

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