^{224}Ac ε decay (2.78 h) 1976MiZR

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, Sukhjeet Singh	ENSDF	08-Mar-2022

Parent: ^{224}Ac: E=0; $J^\pi=(0^-)$; $T_{1/2}$=2.78 h *17*; Q(ε)=1408 *4*; %ε+%$β^+$ decay=90.9 *17*

^{224}Ac-J^π,$T_{1/2}$: From ^{224}Ac Adopted Levels.

^{224}Ac-Q(ε): From 2021Wa16.

1976MiZR (a short conference report): measured Eγ, ε feedings. Authors present Eγ values of three γ rays and ε feeding mainly to 216 level.

Other: 1958Hi78 report ε(217 level)/Σε≥80% from I(K x ray)/Iγ.

^{224}Ra Levels

E(level)	J^π[†]	$T_{1/2}$[†]
0	0^+	3.6319 d *23*
84.4	2^+	
215.75	1^-	
251	4^+	
290	3^-	

[†] From Adopted Levels.

ε,$β^+$ radiations

E(decay)	E(level)	Iε[@]	Log *ft*	I(ε+$β^+$)[†@]	Comments
(1118[&] *4*)	290	≤0.6	≥8.0	≤0.6[#]	εK=0.7718; εL=0.1696; εM+=0.05864
(1157[&] *4*)	251	≤0.6	≥8.0	≤0.6[#]	εK=0.7728; εL=0.1688; εM+=0.05833
(1192 *4*)	215.75	90	5.9	90	εK=0.7737; εL=0.1682; εM+=0.05807
(1324[&] *4*)	84.4	≤0.7	≥8.1	≤0.7[‡]	εK=0.7765; εL=0.1662; εM+=0.05723
(1408[&] *4*)	0	≤0.7	≥8.1	≤0.7[‡]	εK=0.7780; εL=0.1651; εM+=0.05678

[†] From 1976MiZR, per 100 ^{224}Ac decays. Estimated upper limits of ε branchings to 84, 251 and 290 levels are presumably based on I(K x ray)/Iγ data. In the absence of a detailed study of this decay, and with no information available in the excitation energy region between 290 and 1400 keV, evaluators consider the decay scheme to be incomplete. The ε feeding to 216 level and associated log *ft* should be considered as approximate.

[‡] Combined feeding of g.s. and 84 level is ≤0.7%.

[#] Combined feeding of 251 and 290 levels is ≤0.6%.

[@] Absolute intensity per 100 decays.

[&] Existence of this branch is questionable.

γ(^{224}Ra)

E_γ[†]	I_γ[‡&]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α[a]	Comments
(74.4)	≤0.006	290	3^-	215.75	1^-	[E2]	38.5	α(L)=28.3 *4*; α(M)=7.70 *11* α(N)=2.03 *3*; α(O)=0.431 *6*; α(P)=0.0621 *9*; α(Q)=0.0001645 *23*
84.4	1.52 *6*	84.4	2^+	0	0^+	E2	21.2	α(L)=15.55 *22*; α(M)=4.23 *6* α(N)=1.117 *16*; α(O)=0.237 *4*; α(P)=0.0342 *5*; α(Q)=0.0001014 *15*
131.35[#]	26.9[@] *6*	215.75	1^-	84.4	2^+	E1	0.248	α(K)=0.195 *3*; α(L)=0.0409 *6*; α(M)=0.00982 *14*

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γ(^{224}Ra) (continued)

E_γ [†]	I_γ [‡&]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α [a]	Comments
								α(N)=0.00256 *4*; α(O)=0.000562 *8*; α(P)=8.97×10^{-5} *13*; α(Q)=4.82×10^{-6} *7*
(166.4)	≤0.27	251	4$^+$	84.4	2$^+$	E2	1.164	α(K)=0.225 *4*; α(L)=0.691 *10*; α(M)=0.187 *3* α(N)=0.0495 *7*; α(O)=0.01057 *15*; α(P)=0.001554 *22*; α(Q)=1.200×10^{-5} *17*
(205.9)	≤0.32	290	3$^-$	84.4	2$^+$	E1	0.0842	α(K)=0.0671 *10*; α(L)=0.01293 *19*; α(M)=0.00309 *5* α(N)=0.000808 *12*; α(O)=0.000179 *3*; α(P)=2.94×10^{-5} *5*; α(Q)=1.763×10^{-6} *25*
215.75[#]	52.3[@] *12*	215.75	1$^-$	0	0$^+$	E1	0.0754	α(K)=0.0602 *9*; α(L)=0.01151 *17*; α(M)=0.00275 *4* α(N)=0.000719 *10*; α(O)=0.0001598 *23*; α(P)=2.63×10^{-5} *4*; α(Q)=1.591×10^{-6} *23*

† From level-energy differences unless otherwise stated.
‡ Not given by authors. Values are deduced by the evaluator from the authors' ε branches and known γ branching and conversion coefficients (see Adopted Gammas).
# From 1976MiZR.
@ 1958Hi78 report Iγ(216γ)/Iγ(131γ)=2.24 compared to 1.94 *4* from Adopted Gammas.
& Absolute intensity per 100 decays.
a Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

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Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays