^{78}Ga IT decay (<500 ns)

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Ameenah R. Farhan, Balraj Singh	NDS 110, 1917 (2009)	30-Jun-2009

Parent: ^{78}Ga: E=560.0 10; $T_{1/2}$<500 ns; %IT decay≈100.0

^{78}Ga-%IT decay: assumed %IT=100.

Isomer with half-life of <500 ns discovered by C.M. Folden III et al., Phys. Rev. C 79, 064318 (2009) through measurement of delayed γ rays in correlation with implanted ^{78}Ga nuclei.

^{78}Ga produced through the ^{9}Be(^{238}U,X) reaction. ^{238}U beam produced at E=8.00 MeV/nucleon by the K500 and K1200 cyclotrons at the NSCL facility. Reaction products were separated using the A1900 fragment separator and detected using two parallel plate avalanche counters, a Si ΔE detector, four Si detectors, and a plastic scintillator. Measurements of the time-of-flight (TOF), Bρ and total kinetic energy were used to determine the atomic number, mass number and charge state of reaction products. The γ rays were detected with an HPGe detector. Isomer half-life were measured using the time difference between implantation events and HPGe events. Measured particle spectra, Eγ, Iγ, (particle)γ-coincidence and half-life of the isomeric state.

^{78}Ga Levels

E(level)	$J^{\pi\dagger}$	$T_{1/2}$	Comments
0	(3$^+$)		
281.0 7	(1$^+$,2$^+$,3$^+$)		
342.0 7	(1$^+$,2$^+$,3$^+$)		
560.0 10		<500 ns	$T_{1/2}$: from time correlations between implanted ^{78}Ga nuclei and γ-ray events (C.M. Folden III et al., Phys. Rev. C 79, 064318 (2009)).

† From Adopted Levels.

γ(^{78}Ga)

Iγ normalization: listed γ-ray intensity is per 100 fragments of ^{78}Ga.

E_γ	$I_\gamma^{\dagger\ddagger}$	E_i(level)	J_i^π	E_f	J_f^π
218.0 7	>3.1	560.0		342.0	(1$^+$,2$^+$,3$^+$)
278$^\#$		560.0		281.0	(1$^+$,2$^+$,3$^+$)
281.0 7	>4.9	281.0	(1$^+$,2$^+$,3$^+$)	0	(3$^+$)
342.0 7	>1.7	342.0	(1$^+$,2$^+$,3$^+$)	0	(3$^+$)

† Photons per 100 fragments.

‡ For absolute intensity per 100 decays, multiply by ≈1.

$^\#$ Placement of transition in the level scheme is uncertain.

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Decay Scheme

Intensities: I$_{(\gamma+ce)}$ per 100 parent decays
%IT≈100.0

Legend

$\longrightarrow$ I$_\gamma$ <   2%×I$_\gamma^{max}$
$\longrightarrow$ I$_\gamma$ < 10%×I$_\gamma^{max}$
$\longrightarrow$ I$_\gamma$ > 10%×I$_\gamma^{max}$
$\dashrightarrow$ γ Decay (Uncertain)

$^{78}_{31}$Ga$_{47}$