

$^9\text{Be}(^{208}\text{Pb},\text{X}\gamma)$ 2005Ca02,2009A130,2011St21

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	F. G. Kondev, S. Juutinen, D. J. Hartley		NDS 150, 1 (2018)	1-Feb-2018

2005Ca102: Projectile fragmentation of a 1 GeV/A ^{208}Pb beam on a 1.6 g/cm² thick Be target at GSI. Fragments were analysed using the Fragment Recoil Separator (FRS), energy losses and time-of-flight and implanted on a Al plate at the FRS focal plane. Measured E_γ , I_γ , $\gamma\gamma$ coin. and $\gamma\gamma(t)$ coin. using four Clover-type Ge detectors (providing 16 independent Ge crystals). Others from the same experiment: [2000PoZY](#), [2001Ca13](#).

[2009A130](#): Projectile fragmentation of a 1 GeV/A ^{208}Pb beam on a 2.446 g/cm² target. Fragments were analysed using the FRS, energy losses and time-of-flight. Three DSSD were used for β particle detection. Measured E_γ , I_γ , $\beta\gamma$, $\beta\gamma\gamma$ coin. and $\beta\gamma\gamma(t)$ coin. using the RISING spectrometer. Others from the same experiment: [2009A116](#) and [2012A105](#).

[2011St21](#): Projectile fragmentation of a 1 GeV/A ^{208}Pb beam on a 2.526 g/cm² thick Be target backed by a 0.223 g/cm² Nb foil at GSI. Fragments were analysed using the FRS, energy losses and time-of-flight. Measured E_γ , I_γ , $\gamma\gamma$ coin. and $\gamma\gamma(t)$ coin. using the RISING spectrometer.

[2012ReZZ](#): E=478-492 MeV/nucleon from UNILAC-SIS facility at GSI on a 1.035 g/cm² Be target with a 0.221 g/cm² Nb backing. Schottky mass spectrometry technique used to measure masses directly and to identify isomers. Mostly bare atoms of the highly-charged reaction products were separated with FRS and injected into storage ring ESR. The ions were stochastically and electron cooled. Deduced masses from Schottky spectra. Others from the same experiment: [2012Re19](#), [2010Re07](#).

 ^{188}Ta Levels

E(level)	J^π	$T_{1/2}$	Comments
0	$(1^-)^\dagger$	19.6^\dagger s 20	
99 33	$(7^-)^\dagger$	19.6^\dagger s 20	E(level): From 2012ReZZ , assumed by the evaluators to be the excitation energy of the (7^-) isomer. The assignment is tentative.
391 33		3.7 μs 4	E(level): Based on the preferential populaton of high-spin states in fragmentaton reactions, evaluators assume that 292.4 γ populates the (7^-) isomer. It is reported in 2005Ca02 that a low-energy (<50 keV) γ ray may precede or follow the 292.4 keV transition. The assignment is tentative. $T_{1/2}$: Weighted average of 5 μs 2 (from 292.4 $\gamma(t)$ in 2005Ca02), 4.4 μs 10 (from 292 $\gamma(t)$ in 2009A130) and 3.5 μs 4 (from 291.9 $\gamma(t)$ in 2011St21). An isomeric ratio (number of ions found in isomeric state to the total number of ions produced for that nuclide) was measured to be 0.5 % $+3-1$ in 2005Ca02 , but 8 % 2 in 2011St21 .

† See Adopted Levels for details.

 $\gamma(^{188}\text{Ta})$

E_γ	I_γ	$E_i(\text{level})$	E_f	J_f^π	Comments
292.4 2	100	391	99	(7^-)	E_γ : From 2005Ca02 . Others: 291.9 keV 5 (2011St21) and 292 keV (2009A130,2012A105). I_γ : Evaluators assume 100% branch from this level, as no other γ rays were observed. Mult.: The authors in 2005Ca02 ruled out a M2 assignment due to the lack of tantalum x rays in the observed γ -ray spectrum (high conversion coefficient of a M2 transition would lead to an x-ray peak with approximately 70% of the counts observed in a γ -ray peak). However, M1 or E2 assignments cannot be unambiguously excluded.

$^9\text{Be}(^{208}\text{Pb}, X\gamma)$ 2005Ca02, 2009Al30, 2011St21

Level Scheme

Intensities: Relative I_γ

