Adopted Levels

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	10-Jun-2015

Q(β^-)=11670 *SY*; S(n)=3680 *SY*; S(p)=13930 *SY*; Q(α)=−9940 *SY* 2012Wa38
Estimated uncertainties (2012Wa38): 400 for Q(β^-), S(n); 450 for S(p) and Q(α).
S(2n)=9030 *400*, S(2p)=30940 *500*, Q(β^-n)=5690 *400* (syst,2012Wa38).

1994Be24, 1998Do08: ^{104}Y produced and identified in Pb(^{238}U,F), E=750 MeV/nucleon reaction, followed by residue separation at at GSI facility and time-of-flight measurement.

Additional information 1.

1999Wa09: IGISOL on-line mass separator facility from ^{238}U(p,F),E=25 MeV and a high efficiency neutron detector and a careful examination of contaminants by γ spectrometry, measured half-life from decay curve for delayed neutrons.

2009Pe06: ^{104}Y formed by fragmentation of ^{136}Xe beam at 120 MeV/nucleon at NSCL facility using Coupled Cyclotrons and A1900 fragment separator. The time-of-flight and transversal positions of each particle was measured using two plastic scintillators. The energy loss in a Si PIN detector was measured which, when combined with time-of-flight (TOF) and transversal position measurements, allowed for an event-by-event identification of the transmitted nuclei. Transmitted nuclei and their β decays were measured using the β counting system consisting of four Si PIN detectors and a double-sided Si strip detector. β-delayed neutrons were measured in coincidence with β-decay precursor using neutron emission ratio observer (NERO) detector consisting of 60 proportional gas counter tubes embedded in polyethylene moderator matrix. The γ rays were measured with SeGA Ge detectors. Measured isotopic half-lives and delayed neutron emission probabilities Isotopic half-life was measured by 2009Pe06 from least-squares fit and maximum likelihood method of time differences of implantations and correlated β decay events.

2011Ni01: ^{104}Y nuclide produced in Be(^{238}U,F) reactions at E=345 MeV/nucleon produced by the cascade operation of the RBIF complex of accelerators at RIKEN. Target=550 mg/cm^2. Identification of ^{104}Y made on the basis of magnetic rigidity, time-of-flight and energy loss. The separated nuclei were implanted in a nine-layer double-sided silicon-strip detector (DSSSD). Correlations were recorded between the heavy ions and β rays. The half-life of ^{104}Y isotope was measured from the correlated ion-β decay curves and maximum likelihood analysis technique. In the analysis of the decay curve, β-detection efficiency, background rate, daughter and granddaughter (including those populated in delayed neutron decays) half-lives, and β-delayed neutron emission probabilities were considered. Comparison of measured half-lives with FRDM+QRPA and KTUY+GT2 calculations.

2015Lo04: ^{104}Y nuclide produced at RIBF-RIKEN facility in ^{9}Be(^{238}U,F) reaction at E=345 MeV/nucleon with an average intensity of 6×10^{10} ions/s. Identification of ^{104}Y was made by determining atomic Z and mass-to-charge ratio A/Q, where Q=charge state of the ions. The selectivity of ions was based on magnetic rigidity, time-of-flight and energy loss. The separated nuclei were implanted at a rate of 50 ions/s in a stack of eight double-sided silicon-strip detector (WAS3ABi), surrounded by EURICA array of 84 HPGe detectors. Correlations were recorded between the implanted ions and β rays. The half-life of ^{104}Y isotope was measured from the correlated ion-β decay curves and maximum likelihood analysis technique as described in 2014Xu07. Comparison of measured half-lives with FRDM+QRPA, KTUY+GT2 and DF3+CQRPA theoretical calculations.

2013Fa05: calculated half-life, delayed neutron emission probability.

^{104}Y Levels

E(level)	$T_{1/2}$	Comments
0	197 ms *4*	%β^-=100; %β^-n=34 *10* (2009Pe06); %β^-2n=? Theoretical %β^-n=3.80, %β^-2n=0 (2003Mo09). E(level): measured half-life is assumed to correspond to the ground state of ^{104}Y. J^π: 5/2$^+$ neutron and 5/2$^+$ proton orbital from theoretical considerations (1997Mo25). $T_{1/2}$: from weighted average of 198 ms *20* (2015Lo04, ion-β correlated curve); 197 ms *4* (2011Ni01, ion-β-correlated curve); 260 ms *+61−51* (2009Pe06, ion-β correlated curves, systematic uncertainty=10 ms and statistical uncertainty=+60-50 ms combined in quadrature), 180 ms *60* (1999Wa09, neutron-decay curve).