Adopted Levels

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	30-Sep-2020

Q(β^-)=12063 *SY*; S(n)=3240 *SY*; S(p)=19580 *SY*; Q(α)=−16330 *SY* 2017Wa10,2017We16

Q(β^-)=12063 *500* from mass excess (^{77}Ni)=−36800 *500* (syst, 2017Wa10) and measured mass excess (^{77}Cu)=−48862.8 *12* (2017We16). S(n), S(p) and Q(α) are from 2017Wa10.

Estimated uncertainties: 500 for Q(β^-) (2017Wa10, 2017We16), 640 for S(n) (2017Wa10), 780 (2017Wa10) for S(p), and 710 for Q(α) (2017Wa10).

Q(β^-n)=6110 *500*, S(2n)=8910 *580*, S(2p)=37740 *780* (syst, 2017Wa10). Q(β^-2n)=1529 *500* deduced by evaluator from relevant mass excesses in 2017Wa10. The Q((β^-n)) and Q(β^-2n) values are nearly the same when measured mass excesses of ^{76}Cu and ^{75}Cu from 2017We16 are considered.

1995En07: ^{77}Ni nucleus identified by thermal neutron fission of ^{235}U followed by mass separation. A total of about 13 events were assigned to ^{77}Ni.

1997Be12, 1997Be70: ^{77}Ni observed in (^{238}U,X) on Pb and Be targets at E(^{238}U)=750 MeV/nucleon followed by fragment separation.

2005Ho08 (also 2007Sc29,2004St28,2005Sc28): ^{9}Be(^{86}Kr,X) E=140 MeV/nucleon; fully-ionized ^{86}Kr beam, A1900 fragment separator at NSCL facility. Detected β particles correlated with implanted nuclei in Si detectors. Measured yield and half-life of ^{77}Ni.

2014Xu07: ^{77}Ni nuclide produced in ^{9}Be(^{238}U,F) reaction with a $^{238}U^{86+}$ beam of 345 MeV/nucleon produced by the RIKEN accelerator complex. Identification of ^{77}Ni nuclei was made on the basis of magnetic rigidity, time-of-flight and energy loss of the fragments (ΔE-Bρ-tof method) using BigRIPS fragment separator and and ZeroDegree Spectrometer (ZDS) at RIBF-RIKEN facility. Based on A/Q spectrum and Z versus A/Q plot. Measured heavy fragment, β and γ spectra using wide-range active silicon strip stopper array (WAS3ABi) for beta and ion detection, and EUROBALL-RIKEN Cluster array for γ detection. Decay curves were obtained from time differences between implantation and correlated β decays. See also 2014XuZZ thesis.

2017Sa32, 2016Sa07: decay of ^{77}Ni to ^{77}Cu studies at RIBF-RIKEN facility.

Additional information 1.

Theoretical calculations: consult the NSR database at www.nndc.bnl.gov for 21 primary theory references dealing with nuclear structure calculations, and radioactive decays.

^{77}Ni Levels

E(level)	J^π	$T_{1/2}$	Comments
0	(9/2$^+$)	158.9 ms *42*	%β^-=100; %β^-n=26 *16* (2010Ho12,2014XuZZ); %β^-2n=? Only the β^- decay mode has been observed in 2014Xu07 and 2010Ho12, thus 100% β^- decay is assigned by inference. Beta-delayed one-neutron decay mode has also been detected by 2010Ho12. %β^-n: weighted average of 30 *24* (2010Ho12, β^-n-correlated events with ion implants); and 24 *16* (2014XuZZ, $\beta\gamma$-implant analysis). Theoretical $T_{1/2}$=257.7 ms, %β^-n=23, %β^-2n=0 (2019Mo01). Theoretical $T_{1/2}$=770 ms, %β^-n=48.6, %β^-2n=0.3 (2016Ma12). The observed activity is assumed to correspond to the g.s. of ^{77}Ni. J^π: From systematics, dominated by an odd neutron hole in the $1g_{9/2}$ orbital in the shell-model calculations (2017Sa32). Also 9/2$^+$ from systematic trend in 2017Au03, and from Ω_n=9/2$^+$ (theory, 2019Mo01). $T_{1/2}$: from 2014Xu07 ($\beta\gamma$-coin decay curve). Other: 128 ms *+36−32* (2010Ho12) (β-implants decay curve; earlier value of 128 ms *+27−33* in 2005Ho08).