

Adopted Levels

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 179, 1 (2022)	30-Nov-2021

S(p)=-270 SY [2021Wa16](#)

$\Delta S(p)=740$ (syst,[2021Wa16](#)). Other: 505 keV 351 calculated by [1997Or04](#).

S(2p)=-2390 300, Q(ϵp)=18020 660 (syst,[2021Wa16](#)). Others: one possible 2p decay with decay energy of 1.35 MeV 2 reported by [2005Do20](#); 1.29 MeV 4 from [2014Po05](#); 1.29 MeV 33 calculated by [1997Or04](#).

[2014Po05](#) (also [2011Po09](#),[2012Po03](#)): ^{48}Ni ions were produced at NSCL by fragmentation of a E=160 MeV/nucleon ^{58}Ni beam impinging on a 580 mg/cm² thick natural nickel target. Products were selected by the A1900 fragment separator and identified by time of flight and energy loss information then slowed in an aluminum foil and stopped in the active volume of the optical time-projection chamber (OTPC) which was filled with a mixture of He, Ar, and N gases and used to track charged particles. Measured reaction products, half-life, E(p), production σ , proton energy distribution. Deduced $T_{1/2}$, proton emission probabilities, Q(2p).

[2005Do20](#): Ni(^{58}Ni ,X) E=74.5 MeV/nucleon. Measured projectile fragments (SISSI-LISE3 facility at GANIL; 50 μm thick Be degrader in intermediate focal plane, two microchannel plate detectors in first focal plane and four Si detectors at end of LISE3 beam line; tof). Four implantation events recorded; all correlated with subsequent decay events. See [2005B131](#) and [2005Gi15](#) for preliminary results.

[2002Ch28](#),[2001Gi02](#),[2000B101](#): Ni(^{58}Ni ,X) E=74.5 MeV/nucleon. Measured projectile fragments (SISSI; LISE3 separator; 5 Si detectors; tof). 4 events for ^{48}Ni ; $\sigma=0.05$ pb 2. See also [2000B1ZZ](#).

Others: [2003Ba99](#) calculated two-proton decay widths. [2003Br07](#) calculated $T_{1/2}(2p)$ and compared to data. [2003Gr24](#) calculated $T_{1/2}(2p)$ vs decay energy. [2004Pf02](#) compiled theoretical Q's and $T_{1/2}(2p)$'s. [2005Pf01](#) compiled two-proton decay data and theory. [2004Bb14](#) calculated 2p spectroscopic factors.

^{48}Ni decays to ^{46}Fe by 2p decay and to ^{47}Fe by β^+p decay.

 ^{48}Ni Levels

E(level)	J^π	$T_{1/2}$	Comments
0	0^+	2.1 ms +14-6	<p>$\%2p=70$ 20 (2011Po09,2014Po05); $\%\beta^+p=30$ 20 (2011Po09,2014Po05)</p> <p>$T_{1/2}$: measured by 2011Po09 from maximum-likelihood analysis for six events for which decay time could be measured. Two identified ^{48}Ni nuclei were not observed to decay, a possible explanation is that their decay occurred within 70 μs of implantation before the chamber reached full sensitivity. Based on the branching ratios deduced in this study partial half-life for the β^+p channel is 7.0 ms +66-51, and for 2p channel is 3.0 ms +22-12 (2011Po09). Same half-life reported in 2014Po05. Others: 2.1 ms +21-7 from 2005Do20; >0.5 μs (2000B101, estimated from TOF). See 2006Ro09 for calculations of the partial $T_{1/2}$ (^{48}Ni g.s.,$0^+ \rightarrow ^{46}\text{Fe}$ g.s.,0^+)'s for diproton and sequential 2p decay.</p> <p>Decay modes from observation of two events decaying by β^+p decay and four by proton decay (2011Po09). 2005Do20 report one event with decay energy of 1.35 MeV 2 with no β coincident consistent with model predictions for 2p decay, which happens after 1.66 ms and is followed by charged-particle emission with an energy release of 4748 keV 20 after 1.03 ms.</p> <p>One-proton emission energetically forbidden (1997Or04, 1996Co14, 1991Br06).</p> <p>Production $\sigma=100$ fb 30 (2011Po09), 150 fb 50 (2014Po05); 50 fb 20 (2000B101).</p>