## Adopted Levels

| Type | Author | History Citation | Literature Cutoff Date |
|---|---|---|---|
| Full Evaluation | Jun Chen | NDS 174, 1 (2021) | 15-Apr-2021 |

Q($\beta^-$)=11240 *SY*; S(n)=5380 *SY*; S(p)=14700 *SY*; Q($\alpha$)=−11450 *SY* 2021Wa16
ΔQ($\beta^-$)=890, ΔS(n)=500, ΔS(p)=640, ΔQ($\alpha$)=640 (syst,2021Wa16).
S(2n)=9080 *740*, S(2p)=32230 *640*, Q($\beta^-$n)=7360 *400* (syst,2021Wa16).

2010Oh02: $^{123}$Rh nuclide identified in Be($^{238}$U,F) and Pb($^{238}$U,F) reactions with a $^{238}U^{86+}$ beam energy of 345 MeV/nucleon produced by the cascade operation of the RIBF accelerator complex of the linear accelerator RILAC and four cyclotrons RRC, fRC, IRC and SRC. Identification of $^{123}$Rh nuclei was made on the basis of magnetic rigidity, time-of-flight and energy loss of the fragments using BigRIPS fragment separator. Experiments performed at RIKEN facility. Based on A/Q spectrum and Z versus A/Q plot, 920 counts in one setting and 11 counts in another setting were assigned to $^{123}$Rh isotope. (Q=charge state).

2015Lo04: $^{123}$Rh nuclide produced at RIBF-RIKEN facility in $^{9}$Be($^{238}$U,F) reaction at E=345 MeV/nucleon with an average intensity of $6\times10^{10}$ ions/s. Identification of $^{123}$Rh 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 $\beta$ rays. The half-life of $^{123}$Rh isotope was measured from the correlated ion-$\beta$ 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.

2021Ha19: $^{123}$Rh ions were produced by in-flight fission of E=345 MeV primary beam of $^{238}$U on a $^{9}$Be target. Fission products were analyzed and identified by the BigRIPS seperator and the ZeroDegree spectrometer, and implanted into the Advanced Implantation detector Array (AIDA) consisting of six 128x128 strips, 1-mm thick DSSDs. Neutrons were detected with the BRIKEN neutron counter array consisting of 140 $^{3}$He proportional counters. Measured $\beta$-delayed neutrons, $\beta$n(t). Deduced $T_{1/2}$, $\beta$-delayed neutron emission probabilities.

Structure calculations: 2019Mo01, 2017Ko24, 2016Ma12, 2015Sa14, 2014Mi23, 2013Fa08, 2003Mo09, 1997Bo24, 1997Mo25.
Additional information 1.

### $^{123}$Rh Levels

| E(level) | $T_{1/2}$ | Comments |
|---|---|---|
| 0 | 42.2 ms *18* | %$\beta^-$=100; %$\beta^-$n=24.2 *14*; %$\beta^-$2n=?<br>E(level): measured half-life is assumed to correspond to the ground state of $^{123}$Rh.<br>$J^\pi$: $7/2^+$ from systematic trends (2021Ko07); $1/2^-$ predicted in calculations of 2019Mo01.<br>$T_{1/2}$: weighted average of 42.2 ms *18* (2021Ha19, $\beta$-delayed neutron counting) and 42 ms *4* (2015Lo04, (implanted ions)$\beta$ correlated curves).<br>%$\beta^-$n: from $\beta$-delayed neutron counting (2021Ha19).<br>Theoretical $T_{1/2}$=162.3 ms (2019Mo01), 70.7 ms (2016Ma12).<br>Theoretical %$\beta^-$n=70, %$\beta^-$2n=0.0 (2019Mo01); %$\beta^-$n=23.5 %$\beta^-$2n=0.1 (2016Ma12).<br>Measured $\sigma$=1470 pb (2010Oh02), systematic uncertainty≈40%. Probability of misidentification of $^{123}$Rh isotope<0.001% (2010Oh02). |