## Adopted Levels

| History | | | |
|---|---|---|---|
| Type | Author | Citation | Literature Cutoff Date |
| Full Evaluation | Balraj Singh | ENSDF | 20-Jul-2015 |

Q($\beta^-$)=13390 *SY*; S(n)=3730 *SY*; S(p)=15100 *SY*; Q($\alpha$)=−12080 *SY* 2012Wa38
Estimated uncertainties (2012Wa38): 500 for Q($\beta^-$), 570 for S(n), 640 for S(p) and Q($\alpha$).
S(2n)=9140 *500*, Q($\beta^-$n)=7180 *450* (syst,2012Wa38). S(2p)=32200 (1997Mo25,theory).
2010Oh02: $^{124}$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 RBIF accelerator complex of the linear accelerator RILAC and four cyclotrons RRC, fRC, IRC and SRC. Identification of $^{124}$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, 94 counts were assigned to $^{124}$Rh isotope (Q=charge state).
2015Lo04: $^{124}$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 $^{124}$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 $^{124}$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.
Additional information 1.

### $^{124}$Rh Levels

| E(level) | $T_{1/2}$ | Comments |
|---|---|---|
| 0 | 30 ms *2* | %$\beta^-$=100; %$\beta^-$n=?; %$\beta^-$2n=?<br>Theoretical $T_{1/2}$=31.0 ms, %$\beta^-$n=16.8, %$\beta^-$2n=0.40 (2003Mo09).<br>Measured $\sigma$=110 pb (2010Oh02), systematic uncertainty≈40%. Probability of misidentification of $^{124}$Rh isotope<0.001% (2010Oh02).<br>E(level): measured half-life is assumed to correspond to the ground state of $^{124}$Rh.<br>$T_{1/2}$: measured by 2015Lo04 from (implanted ions)$\beta$ correlated curves in time and position using maximum likelihood method. See 2015Lo04 for comparison of their experimental value with theoretical values. |