^{217}Rn - Comments on evaluation of the decay data
by Huang Xiaolong, Wang Baosong

This evaluation was completed in 2007. Literature available by December 2007 was included.

1 Decay Scheme
^{217}Rn disintegrates 100 % by α emission to the levels in ^{213}Po. α decay of ^{217}Rn occurs directly to the ground state of ^{213}Po. ^{217}Rn ground state has $J^{\pi} = 9/2^{+}$ (2007Ba19).

2 Nuclear Data
The Q value is from the 2003Au03 evaluation.
The level energy, spin and parity are from 2007Ba19.
The measured and recommended ^{217}Rn half-life values are listed in Table 1.

Table 1 - Measured half-life values of ^{217}Rn and recommended value, in ms.

$T_{1/2}$ (ms)	References	notes
1.0 (1)	1951Me10	
0.54 (5)	1961Ru06	
0.54 (5)	2007Ba19	Nucl. Data Sheets, from 1961Ru06
0.54 (5)	Recommended value	from 1961Ru06

The recommended value is taken from the measurement of 1961Ru06.

2.1 a Transition
The measured alpha-particle energies are listed in table 2. The Q-value of 2003Au03 was used to determine the energy and uncertainty of the single alpha particle transition to the ground state of ^{213}Po.

An α transition of energy 7507 keV (no uncertainty) with ~ 0.1 % intensity was observed by 1961Ru06. The first excited state in ^{213}Po has been observed at 293 keV in ^{213}Bi decay. If the 7507 keV group belonged to ^{217}Rn, from the 7887 keV it would give 243 keV for the level energy of the first excited state. In addition 1961Ru06 did not observe any α-γ coincidence. The evaluator believes that the uncertain 7507 keV group reported by 1961Ru06 probably belongs to an impurity because no positive identification could be made by 1961Ru06.

Table 2 - Measured and recommended values of α-particle energy from ^{217}Rn decay

1961Ru06	1982Bo04	1991Ry01[a]	Adopted value
7735 (4)	7739 (2)	7741 (2)	**7742 (3)**

a: Original energies of 1982Bo04 have been increased by 2 keV due to changes in calibration energies (1991Ry01).

So the evaluated alpha particle emission probability of the single alpha particle is 100 %.

The alpha hindrance factor HF = 1.49 was calculated using a parameter R0 = 1.562 (8) (2007Ba19), average of R0(^{212}Po) = 1.5649 (8) and R0(^{214}Po) = 1.559 (8) ; (1998Ak04).

3. References

1951Me10   W.W.Meinke, A.Ghiorso, G.T.Seaborg, Phys.Rev. 81, 782 (1951) [T$_{1/2}$].
1961Ru06   C.P.Ruiz, UCRL-9511 (1961) [E$_\alpha$,T$_{1/2}$].
1982Bo04   J.D.Bowman, R.E.Eppley, E.K.Hyde, Phys.Rev. C25, 941 (1982) [E$_\alpha$].
1991Ry01   A.Rytz, At.Data Nucl.Data Tables 47, 205 (1991) [Evaluation].
2003Au03   G.Audi, A.H.Wapstra, C.Thibault, Nucl. Phys. A729(2003)129 [Q].
2007Ba19   M.S.Basunia, Nucl.Data Sheets 108, 633 (2007) [NDS]