Adopted Levels

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 156, 1 (2019)	31-Jan-2019

Q(β^-)=−1270 *SY*; S(n)=5790 *SY*; S(p)=3180 *SY*; Q(α)=7800 *SY* 2017Wa10

Estimated uncertainties (2017Wa10): 100 for Q(β^-) and S(p), 110 for S(n), 140 for Q(α).

S(2n)=13200 *160*, S(2p)=8420 *110* (syst,2017Wa10).

Assignment: ^{253}Es(46-MeV ^{4}He,3n); chemistry, parent of ^{254}Fm (1970Fi12).

Both the known activities of ^{254}Md decay almost 100% by β^+,ε decays, but no experimental data are available for details of the two decays and level structure in ^{254}Fm. Based on particle plus rotor model phenomenological calculations, 2017So07 analyzed β^++ε decays of the 10-min and 28-min activities of ^{254}Md to ^{254}Fm, and concluded that 10-min activity, assigned as π1/2[521]⊗ν1/2[620], K^π=0$^-$, J^π=1$^-$ is the ground state, and the 28-min activity, assigned as π7/2[514]⊗ν1/2[620], K^π=3$^-$, J^π=3$^-$ isomer lying within a few keV of the 10-min ground state.

1986So12: calculated levels, bandhead energies, K^π, isomer $T_{1/2}$.

Additional information 1.

^{254}Md Levels

For the g.s. configuration, analogy to ^{255}Md and to ^{257}Md suggests π7/2[514] orbital for the 101th proton and analogy to ^{251}Cf and to ^{249}Cm suggests ν1/2[620] orbital for the 153rd neutron. Energies of the π1/2[521] and the ν 7/2[613] Nilsson states should be low. Combinations of these quasiparticle states suggests the following possible configurations for the g.s. and low-energy states: 3$^-$, π7/2[514]⊗ν1/2[620]; 4$^-$, π7/2[514]⊗ν1/2[620]; 3$^-$, π1/2[521]⊗ν7/2[613]; 4$^-$, π1/2[521]⊗ν7/2[613]; 0$^-$, π7/2[514]⊗ν7/2[613]; 7$^-$, π7/2[514]⊗ν7/2[613]; 0$^-$, π1/2[521]⊗ν1/2[620]; 1$^-$, π1/2[521]⊗ν1/2[620].

Cross Reference (XREF) Flags

A ^{258}Lr α decay (3.92 s)

E(level)†	$T_{1/2}$	XREF	Comments
0	10 min *3*		%ε+%β^+≈100 E(level),J$^\pi$: based on model analysis by 2017So07, the 10-min activity is assigned configuration=π1/2[521]⊗ν1/2[620],K^π=0$^-$ and J^π=1$^-$. No α decays associated with ^{254}Md decay could be identified by 1970Fi12. The authors pointed out that ^{254}Fm and ^{256}Md isotopes were also present in the source, and any α branches from ^{254}Md would be indistinguishable since they would fall in the energy region of main α branches from ^{254}Fm and ^{256}Md decays. $T_{1/2}$: measured by 1970Fi12 from the growth of ^{254}Fm. The fermium fraction was milked immediately after the irradiation.
0+x	28 min *8*		%ε+%β^+≈100 E(level),J$^\pi$: based on model analysis by 2017So07, the 28-min activity is assigned configuration=π7/2[514]⊗ν1/2[620],K^π=3$^-$ and J^π=3$^-$ within a few keV of the ground state. $T_{1/2}$: determined by 1970Fi12 from relative abundances of ^{254}Fm and ^{255}Fm in successive milking following 1-hour irradiations and chemical purifications of recoil atoms. The half-life was derived relative to ^{255}Md half-life; $T_{1/2}$(^{255}Md)=27 min *2* was measured by the authors. No α decay from this state could be identified (1970Fi12).
83 *30*		A	
114 *30*		A	
144 *30*		A	
175 *30*		A	

Continued on next page (footnotes at end of table)

Adopted Levels (continued)

^{254}Md Levels (continued)

† Excited level energies are from ^{258}Lr α decay. These levels should not be considered well established. See comments with the ^{258}Lr α decay data.