**β decay of 20Mg to 20Na Proton Emission [20Na(p)19Ne]**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Ei(keV)** | **Iβ (%)** | **Jπ** | **log(ft)** | **B(GT)** | **Ef(keV)** | **Ep(keV)** | **Ip(%)** |
| 984.25(0.10) | 69.72(1.2) | 1+ | 3.83(2) | 0.579(30) |  |  |  |
| 2645 | 0.1 | 1+ | ≥6.24 | ≤0.002 | 0 | e457(3) | e≤0.02 |
| 3001(2) | 11.5(14) | 1+ | 4.08(6) | 0.33(5) | 0 | 806(2) | 11.5(14) |
| e3075(15) | 0.5(1) |  |  |  | 0 | e885(15) | 0.5(1) |
| 3874(10) | 4.8 (6) | 1+ | 4.17(6) | 0.27(4) | 238  0 | 1441(30)  1679(15) | 4.8(6) |
| 4123(16) | 2.7 (3) | 1+ | 4.33(6) | 0.18(3) | 0 | 1928(16) | 1.1(2) |
| 4800 | 1.9 | 1+ | ≤4.23[3.95(6)] | ≥0.23[0.45(7)] | 1536  238,275  0 | 1056(30)  2344(25)  2559(45) | 0.7(1)  0.3(1)+0.8(1) |
|  |  |  |  |  |  | d2256(18) | d0.3(1) |
| 5600 | 1.5 | 1+ | ≤3.97[3.70(6)] | ≥0.42[0.79(10)] |  |  |  |
| b5836(13) | b0.56(7) | b1+ | b4.34(3) |  |  |  |  |
| 6266(30) | 1.2(1) | 1+ | 3.72(6) | 0.77(11) | 238,275  0 | 3837(35)  4071(30) | 0.2(1)+0.1(1)  0.7(1) |
| 6521(30) | 3.3 | 0+ | 3.13(6) | 4.57(68) | 238,275  0  c1615.29 (30) | 4071(30)  4326(30)  c2700(23) | 0.59(1)+0.32(1)  1.8(3)  c0.212(7) |
| 6770 | 0.03(8) | 1+ | ≤5.01 | ≥0.04 |  |  |  |
| 6920 | 0.01 | 1+ | ≤5.39 | ≥0.03 |  |  |  |
| b7183(16) | b0.08 | b1+ |  |  |  |  |  |
| 7440 | 0.01 | 1+ | ≤4.99 | ≥0.04 | c4034.7  (16) | c | c0.0149(35) |

**d**Half life of 20Mg =90±0.6 ms

(All unmarked values are taken from reference a)

Proton Separation energy(20Na)= 2190 keV

**a Piechaczek et al./Nuclear Physics A 584 (1995)**

**b Lund et al. Eur. Phys. J. A (2016) 52: 304**

**c Glassman et al. PHYSICAL REVIEW C 99, 065801 (2019)**

**d Sun et al. PHYSICAL REVIEW C 95, 014314 (2017)**

**e Wallace et al. Physics Letters B 712 (2012) 59–62**

**Gamma ray transition (19Ne)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Ei**  **(MeV)** | **Ef**  **(MeV)** | **Eγ**  **(MeV)** | **Iγ** | **B.R(%)** |
| 0.238(10) | 0 | 0.238  (10) | (3*.*80 ± 0*.*07stat ± 0*.*08sys ) × 10−2 | 100 |
| 0.275(10) | 0 | 0.275  (10) | (3*.*59 ± 0*.*06stat ± 0*.*08sys ) × 10−2 | 100 |
| 1.51(25) | 0.275  0.238 | 1.232  (22)  1.269(24)  1.51 | (2*.*36 ± 0*.*04stat ± 0*.*05sys ) × 10−3  (4*.*18 ± 0*.*12stat ± 0*.*09sys ) × 10−4 | 84.9  15.1 |
| 1.535  (24) | 0.275  0.238  0 | 1.261(24)  1.297 (22)  1.535(24) | (6*.*75 ± 0*.*15stat ± 0*.*15sys ) × 10−4  (1*.*539 ± 0*.*027stat ± 0*.*033sys ) × 10−2  (5*.*68 ± 0*.*44stat ± 0*.*17sys ) × 10−4 | 4.05  92.53  3.42 |
| 1.61  (30) | 0.275  0.238  0 | 1.340(25)  1.377(3)  1.61(30) | (1*.*57 ± 0*.*03stat ± 0*.*03sys ) × 10−3  (1*.*82 ± 0*.*41stat ± 0*.*04sys ) × 10−4  (3*.*68 ± 0*.*18stat ± 0*.*08sys ) × 10−4 | 74.0  8.6  17.49 |
| b2.795 | b0.238 | b2.557 |  | 100 |
| 4.03  (16) | 0  b1.535  b0.28 | 4.03(16)  b2.499  b3.75 | (1*.*19 ± 0*.*12stat ± 0*.*12sys ) × 10−4 | 80(15)  b5±5  b15±5 |
| b 4.14 | b1.51 | b2.635 |  | b 100 |
| b 4.20 | b 0.238  b 1.51 | b 3.962  b 2.69 |  | b 20±5  b 80±5 |
| b 4.38 | b 0.238  b 0.279 | b 4.142  b 4.101 |  | b 85±4  b 15±4 |
| b 4.55 | b 0  b 0.275 | b 4.55  b 4.275 |  | b 35±25  b 65±25 |
| b 4.60 | b 0.238  b 1.54 | b 4.362  b 3.06 |  | b 90±5  b 10±5 |
| b 4.64 | b 2.79 | b 1.85 |  | b 100 |

Half life of 19Ne=17.22 sec

α Separation energy(19Ne)= 3529 keV

**a Glassman et al. PHYSICAL REVIEW C 99, 065801 (2019)**

**b D.R. Til1ey et al./ Nuclear Physics A 595 (1995) 1-170**

(All unmarked values are taken from reference a)

20Na(β) 20Ne , 20Ne(α) 16O

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Nuclide | Decay  Mode | Eα (c.m.) | Iα(rel)% | Iα(abs)% | Eemitter(20Ne)b | Edaughter(16O) b |
| 20Na | βα | 0.893(4)a  1.059(5) a  1.525(30) a  1.995(5) a  2.6915(10) a | a  a  0.006(2) a  0.0083(12) a  100(15) a | 0.0012(4)  0.0066(10)  20.1(3) | 5.6214(7) 0  5.7877(26) 0  6.725(5) 0  7.4219(12) 0 |  |
|  |  | 3.0996(21)  3.324(7)  4.463(25)  4.749(3)  5.540 | 3.65(43)  0.074(6)  0.39(4)  1.51(27)  17.31(9) | 0.73(9)  0.015(1)  0.078(8)  0.303(7)  3.47(5) | 7.8334(15) 0  8.054(7) c  0  9.192(25) c 0  9.467(5) 0  10.2732(19) 0 |  |
|  |  | 5.844(3)  6.106(3)  6.208(7)  6.383(7)  6.561(4)  7.123(6) | 0.553(15)  1.09(3)  0.075(9)  0.055(7)  0.165(11)  0.010(2) | 0.111(3)  0.219(7)  0.015(2)  0.011(2)  0.033(2)  0.0020(4) | 10.584(5) 0  10.843(3) 0  10.940(9) 0  11.116(9) 0  11.291(4) c 0  11.885(7) 0 |  |

All values taken from ***[Nucl. Phys. A 493, 293 (1989)],*** except where noted.

Other β-α reference: ***[Nucl. Phys. Rev.35, 445 (2018***).]

a [2013La22].

bValues from adopted levels in ENSDF [***Nucl. Phys. A 636, 249 (1998)***], except where noted.

cCalculated from α energies and Sα ( 20Ne) = 4729.84 keV [***Chin. Phys. C 41, 030003 (2017)***

**Branching in 19Ne(β+) 19F**

|  |  |  |  |
| --- | --- | --- | --- |
| **Decay to 19F (MeV)** | **Branching Ratio** | **Jπ** | **logftc** |
| 0 | 99.99 |  | 3.237±0.002 |
| 0.11 | (1.2 ±0.2)x10-2 |  | 7.061±0.072 |
| **c**1.55 | (2.2 ±0.21)x10-3**d** |  | 5.7±0.041 |

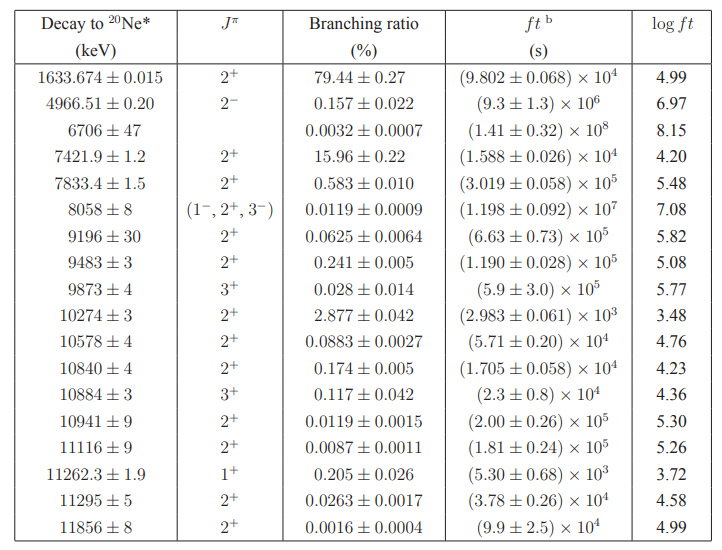
a ***Phys. Rev. C 27 (1983) 2833*** and ***Phys. Rev. C 24(1981) 313 (***All values are taken from this ref.)

***b At. Data Nucl. Data Tables 33 (1985) 347***

c Eγ, for 19F\* (1.55 → 0.20) = 1356.924→0.15 keV (***Phys. Rev. C 13 (1976) 2593***), 1356.844→0.13 keV (***Phys. Rev. C 27 (1983) 2833***).

d From (***Phys. Rev. C 13 (1976) 2593***, ***Phys. Rev. C 27 (1983) 2833***).

**Branching in 20Na(β+) 20Ne**



***a*** [***Nuclear Physics A***](https://www.sciencedirect.com/science/journal/03759474)***,***[***493, 2***](https://www.sciencedirect.com/science/journal/03759474/493/2)***, (1989), 293-322*** (All values are taken from this ref)

**b** Allowed decays assumed