^{22}Ne(n,n),(n,γ):res 2014He25

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia[#], A. Chakraborty[##]	NDS 171, 1 (2021)	1-Jun-2020

Other: 2002Be37.

2014He25: Target – 99.8% enriched ^{22}Ne gas target in stainless steel cylinder at 150 atmospheric pressure. Neutrons were produced from ^{7}Li(p,n)^{7}Be reaction with a pulsed proton beam of 1.0 ns width and a variable repetition rate of 1 MHz and 250 kHz for the capture and transmission runs, respectively. E=5 to 800 keV. Neutrons were detected using two C_6D_6 liquid scintillation detectors, neutron energy resolution was 0.2 and 1.5 keV at 30 and 200 keV, respectively. Neutron capture events were detected using the C_6D_6 detectors in combination with the pulse height weighting technique. The resonances in the capture cross sections were identified and analyzed using the multilevel R-matrix code SAMMY. Deduced Maxwellian-averaged cross sections (MACS) for stellar (n,γ) from 5 to 100 kT (keV). At kT=30 keV thermal energy, MACS value is 53.2 μb *27* for ^{22}Ne.

2002Be37: E=25-215 keV; measured capture σ; deduced astrophysical reaction rates.

^{23}Ne Levels

Γ_γ=200 eV was used as the adjusted value for each resonance to fit the experimental MACS values.
g=(2J$_{res}$+1)/((2J$_n$+1)(2J$_{^{22}Ne\ g.s.}$+1)).

E(level)[†]	J$^\pi$[‡]	L[‡]	Comments
5460.7 *3*	1/2$^-$	1	Γ_n=8.23 keV *19* Resonance energy=272.0 keV *3* (Lab). g=1.
5478.6 *3*	1/2$^+$	0	Γ_n=28.61 keV *47* Resonance energy=290.7 keV *3* (Lab). g=1.
5608.9 *5*	1/2$^-$	1	Γ_n=8.20 keV *31* Resonance energy=427.1 keV *5* (Lab). g=1.
5672.0 *5*	1/2$^+$	0	Γ_n=118.8 keV *21* Resonance energy=493.1 keV *5* (Lab). g=1.
5739.9 *6*	3/2$^+$	2	Γ_n=5.10 keV *18* Resonance energy=564.1 keV *6* (Lab). g=2.
5860.7 *7*	3/2$^-$	1	Γ_n=37.5 keV *11* Resonance energy=690.4 keV *7* (Lab). g=2.
5967 *5*	1/2$^+$	0	Γ_n=27.2 keV *51* Resonance energy=802 keV *5* (Lab). g=1.

[†] From Sn(^{23}Ne)=5200.65 *10* (2017Wa10)+E(n)(c.m. system), deduced from reported resonance energies (Lab) in Table II of 2014He25. E(n)(c.m.) = mass of ^{22}Ne/(mass of ^{22}Ne + mass of n)×E(n) (Lab).

[‡] From capture cross section fittings using the multilevel R-matrix code SAMMY.