^{14}N(α,p),^{4}He(^{14}N,γ^{17}O) 1969Ro07,1969Ba17

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	C. G. Sheu, J. H. Kelley, J. Purcell	ENSDF	5-Aug-2021

1953He58: ^{14}N(α,p), E=1.5-3.5 MeV; measured products, ^{17}O, Eα, l_α; deduced $\sigma(\theta)$.
1961Ya02: ^{14}N(α,p), E=26.8,28.1,33.3 MeV, measured angular distributions.
1967Be30: ^{14}N(α,αp), E=22.9 MeV; deduced nuclear properties.
1969Ba17: ^{14}N(α,αp), E=22.9 MeV; measured σ(E$_\alpha$,E$_p$,$\theta(\alpha)$). Natural target.
1969Ro07: ^{14}N(α,p), E=13-18 MeV; measured σ(E; Ep,θ) (absolute). ^{17}O deduced levels, J. Natural target.
1969Sc21: ^{14}N(α,p), E=7-12 MeV; measured $\sigma(\alpha,n)/\sigma(\alpha,p)$ ratio, σ(E; Eγ,Ep,θ(p)).
1970Ze01: ^{14}N(α,p), E=10-25 MeV; measured σ(E; Ep,θ); deduced reaction mechanism. ^{17}O levels deduced configurations.
1974Sc09: ^{14}N(α,pγ), E=10 MeV; used Doppler-shift attenuation method (DSA) to deduce T$_{1/2}$ for 0.871 MeV state of ^{17}O.
1975Th01: ^{14}N(α,pγ), measured σ(Eγ).
1987MiZY: ^{14}N(α,p), E=48 MeV; measured σ(Ep). ^{17}O deduced levels.
1988BrZY: ^{14}N(α,p), E=48 MeV; measured not given. ^{17}O deduced levels, J, π.
1992Ar08: ^{14}N(α,p), E=5.2-7.5 MeV; measured $\sigma(\theta)$ vs E. Accurate nitrogen profile determination, TiN, NbTiN films, nitrogen implanted steel.
1994Gi14: ^{14}N(α,p), E=4-5 MeV; measured $\sigma(\theta)$ vs E; deduced elemental composition determination precision features.
1996Gi14: ^{14}N(α,p), E=3.9-5 MeV; measured products, ^{17}O, Eα, Iα; deduced $\sigma(\theta)$.
1999Xu07: ^{14}N(α,p), E=5.6-7.4 MeV; measured products, ^{17}O, Eα, Iα; deduced $\sigma(\theta)$.
2005De54: ^{14}N(α,p), E=4893-6047 keV; measured $\sigma(\theta$=172°).
2006We05: ^{14}N(α,p), E=3.2-4.0 MeV; measured σ.
2008Te09: ^{14}N(α,p), E=3.5-6 MeV; measured reaction products, Eα, Iα; deduced $\sigma(\theta)$, yields. Comparison with available data.
2017Ko31: ^{4}He(^{14}N,p), E=35.6 MeV; measured reaction products, Eα, Iα; deduced $\sigma(\theta)$.
2018Sm01: A beam of ^{14}N, delivered by the NSCL/ReA3 facility, impinged on a 10^{19} atom/cm^2 ^{4}He gas jet target at the JENSA facility. The scattered α particles and reaction protons, from ^{14}N(α,p) reactions, were momentum analyzed in the SuperORRUBA position sensitive Si barrel array. In addition, a set of 9 2"×2" LaBr$_3$(Ce) scintillator detectors from the HAGRiD array were placed at θ_{lab}≈90° and detected coincidence γ rays. A group of E$_\gamma$≈871 keV photons was obsereved in coincidence with the reaction protons.

Theory:
1962Ga16: Analysis of delayed coincidence lifetime measurements.
2014Ba35: ^{14}N(α,p), analyzed previous σ data by R-matrix. Comparison with previous experimental results, evaluated data, and theoretical calculations.
2015Vo02: ^{14}N(α,p), E=8.674 MeV; calculated reaction probability of nonthermal reaction, effective temperature of non-Maxwellian α particles from ^{7}Li(p,α) reaction. ^{14}N(α,p)^{17}O; calculated forward (p,α) and reverse (α,p) reactivities. Impact on CNO cycles and ^{17}O abundance in standard solar model (SSM).
2017Ch32: ^{14}N(α,p), E not given; analyzed available data; deduced yields.
2017Vo11: ^{14}N(α,p), E<8.7 MeV; calculated probability and rate of suprathermal (α,p) reaction in the CNO cycle, comparative contribution of α particles from ^{7}Li(p,α), ^{3}He(^{3}He,α) reactions and ^{8}B β^+ decay to ^{8}Be* to 2α. Impact on ^{17}O and ^{18}O abundances in the outer core region.

^{17}O Levels

E(level)[†]	T$_{1/2}$	L	Comments
0		2	L: from (1961Ya02).
871	170 ps *7*	0,(2)	Γ: from τ=245 ps *10* (1974Sc09). See also τ=434 ps *11* (1962Ga15, 1962Ga16). L: from (1961Ya02).
3058		1	L: from (1961Ya02).
3846		3	L: from (1961Ya02).
4555			
5083			

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^{14}N(α,p),^{4}He(^{14}N,γ^{17}O) 1969Ro07,1969Ba17 (continued)

^{17}O Levels (continued)

E(level)[†]	J^π	Comments
5217	(7/2,9/2,11/2)	J^π: from (1969Ro07) on the basis of a possible statistical compound nuclear mechanism and the use of the (2J+1) rule.
5378		
5697		
5729		
5866		
5940		
6380		
6870		
6990		
7167		
7373		
7560		
8460 *70*		E(level): See also 8480 keV *50* (1967Be30: doublet).
8880 *70*		E(level): See also 8910 keV *50* (1967Be30).
9140 *70*		E(level): See also 9170 keV *50* (1967Be30).
9790 *70*		E(level): See also 9840 keV *80* (1967Be30).
10660 *70*		E(level): See also 10700 keV *50* (1967Be30).
12000 *70*		E(level): See also 12050 keV *50* (1967Be30).
12430 *70*		
12740 *70*		
13.57×10^3 *10*		

[†] For $E_x \leq 7.6$ MeV: nominal level energy values listed and observed in (1969Ro07). For levels $E_x \geq 8.46$ MeV: from (1969Ba17: the sequential decay of ^{14}N(α,αp)^{13}C reaction appears to take place via a number of ^{17}O states which are believed to have $J \geq 5/2$, $\Gamma_\alpha/\Gamma \geq 0.6$). For other observations or the angular distributions or the cross sections for the ^{14}N(α,p) reaction to many ^{17}O states have been studied in (1953He58, 1961Ya02, 1970Ze01, 1996Gi14, 1999Xu07, 2005De54, 2006We05, 2008Te09, 2017Ko31).

$\gamma(^{17}O)$

E_γ	E_i(level)	E_f	Comments
870.7 *2*	871	0	E_γ: from (1975Th01). See also (1969Sc21,1974Sc09,2018Sm01).

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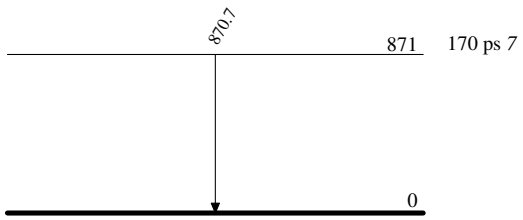
Level Scheme



$^{17}_{8}O_9$