^{60}Ni(α,t) 2013Sc06,1967Ar05

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Kazimierz Zuber, Balraj Singh	NDS 125, 1 (2015)	25-Jan-2015

2013Sc06, 2013ScZZ: E(α)=38 MeV from WNSL-Yale tandem accelerator facility. Measured triton spectra, $\sigma(\theta)$, spectroscopic factor C^2S using a split-pole spectrograph. FWHM ≈64 keV. Target=204 μg/cm^2 thick, 99.7% enriched. Deduced levels, J, π. DWBA analysis. Comparison with shell-model calculations.

The main purpose of the neutron adding and neutron removal reaction studies by 2013Sc06 was to obtain occupancies of neutron orbitals, proton vacancies, and energy centroids of neutron, neutron-holes, proton-single particle excitations in ^{60}Ni and ^{62}Ni, and thereby investigate closure of $0f_{7/2}$ shell. Some data details of this study are supplied in 2013ScZZ.

1967Ar05: E(α)=26.7 MeV. Measured $\sigma(\theta)$, θ(c.m.)=11°−48°.ΔE−E semi telescope with FWHM≈90 keV. Enriched target. Three groups are reported at 0, 470 and 970 keV.

L-values and spectroscopic factors are from comparisons with DWBA calculations with a DWBA normalization factor of 38.4.

All data are from 2013Sc06, 2013ScZZ unless otherwise stated.

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dσ/dΩ in mb/sr (2013ScZZ)

Level	5° (α,t)
0	1.92
475	0.56
970	4.11
1311	0.51
1394	0.43
1933	0.11
2203	0.42
2721	4.1
2840	0.26
3019	0.14
3092	0.041
3406	0.057
3578	0.12
3863	0.037

The uncertainties in cross sections are ≈4% for σ>1 mb/sr, ≈7% for 0.1<σ< 1.0 mb/sr, and ≈18% for σ< 0.1 mb/sr at their respective maxima. The uncertainties arising from possible contaminants or previously unidentified states for very weak transitions could be ≈0.02 mb/sr.

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^{61}Cu Levels

E(level)[†]	Jπ	L[‡]	C^2S	Comments
0	$(3/2)^-$[#]	1[@]	0.59[@]	
475	$(1/2)^-$[#]	1[@]	0.99[@]	
970	$(5/2)^-$[#]	3	3.67	C^2S: 0.86 (1967Ar05).
1311		3	0.90	C^2S: for $J^\pi=7/2^-$.
1394		3	0.44	C^2S: for $J^\pi=5/2^-$.
1933				
2203		3	0.59	C^2S: for $J^\pi=5/2^-$.
2721		4	3.29	C^2S: for $J^\pi=9/2^+$.
2840				

Continued on next page (footnotes at end of table)

^{60}Ni(α,t) 2013Sc06,1967Ar05 (continued)

^{61}Cu Levels (continued)

E(level)[†]
3019
3092
3406
3578
3863

[†] 2013Sc06 quote level energies from 1999-NDS for A=61 (1999Bh04); these values are close to those in Adopted Levels here.
[‡] From DWBA analysis of $\sigma(\theta)$.
[#] From J-dependence of $\sigma(\theta)$ and S extraction (1967Ar05).
[@] From 1967Ar05. Because of poor fits to the data, large uncertainties are associated with the extraction of C^2S.