

$^1\text{H}(^{17}\text{C}, ^{16}\text{Cn}), ^1\text{H}(^{19}\text{C}, ^{16}\text{Cn})$  2008Sa03

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	J. H. Kelley, G. C. Sheu	ENSDF	01-May-2017

Beam= $^{17}\text{C}$  and  $^{19}\text{C}$ , target=liquid  $\text{H}_2$ .

2008Sa03:

XUNDL set compiled by S. Geraedts and B. Singh (McMaster) Feb 2008.

Beams of  $E=70$  MeV/nucleon  $^{17}\text{C}$  and  $^{19}\text{C}$  were separately produced at the RIKEN/RIPS facility by fragmenting a 110

MeV/nucleon  $^{22}\text{Ne}$  in a thick target. The beams impinged on a 3 cm diameter cryogenic hydrogen target with 120 mg/cm<sup>2</sup> areal density. The  $\gamma$ -rays from reactions in the target were detected using 48 NaI(Tl) scintillators while charged particles were detected with a plastic counter hodoscope. Neutrons, from  $^{17}\text{C}$  breakup, were detected using a neutron hodoscope consisting of two walls of plastic scintillator array.

The authors measured (charged fragments)(neutron) coin, ( $\gamma$ )(charged particles) coin, angular distributions of charged particles.

DWBA analysis. The inclusive  $^{17}\text{C}\rightarrow^{16}\text{C}+n$  and exclusive  $\rightarrow^{16}\text{C}+n+\gamma[^{16}\text{C}^*(2^+)=1.77\text{ MeV}]$  spectra were analyzed. A resonance at  $E(\text{rel})=1.47$  MeV was observed in the inclusive spectrum, but absent in the exclusive  $\gamma$ -ray coincidence events; evidence the state decays to  $^{16}\text{C}_{\text{g.s.}}$ . Other resonances at  $E_{\text{res}}=0.55$  and 3.63 MeV were observed in coincidence with the  $^{16}\text{C}^*(2^+)=1.77$  MeV de-excitation  $\gamma$  ray.

The angular distributions of the  $E_x=2.2$  and 3.1 MeV resonances were analyzed and compared with DWBA calculations.

1999He33: A theoretical analysis of the  $^{16}\text{C}+n$  astrophysical neutron capture reaction rate given.

See also discussions in (2008Ka39,2008Sa39).

 $^{17}\text{C}$  Levels

E(level) <sup>†</sup>	$J^\pi$	$\Gamma$ (MeV)	$\sigma$ (mb) <sup>a</sup>	Comments
0	3/2 <sup>+</sup>			
2200 <sup>#</sup> 30	7/2 <sup>+</sup> ‡	0.53 MeV 4	3.8 2	Resonance energy (c.m.)=1470 20 (g.s. in $^{16}\text{C}$ ).
3050 <sup>@&amp;</sup> 30	9/2 <sup>+</sup> ‡		0.40 4	Resonance energy (c.m.)=550 20 (1770 10, 2 <sup>+</sup> excitation energy in $^{16}\text{C}$ ).
6130 <sup>@&amp;</sup> 90	5/2 <sup>+</sup>	0.26 MeV +40–26	0.8 1	$J^\pi$ : from comparisons with structure calculations. Resonance energy=3630 90 (1770 10, 2 <sup>+</sup> excitation energy in $^{16}\text{C}$ ).

<sup>†</sup> Excitation energy=resonance energy+S(n)+excitation energy of the daughter nucleus  $^{16}\text{C}$ .

<sup>‡</sup> From comparison of  $\sigma(\theta)$  distributions with DWBA calculations for  $^{17}\text{C}(p,p')$  reaction.

<sup>#</sup> Observed in  $^1\text{H}(^{17}\text{C}, ^{16}\text{C}_{\text{g.s.}}n)$  reactions.

<sup>@</sup> Observed in  $^1\text{H}(^{17}\text{C}, ^{16}\text{C}^*(1.77\text{ MeV})n)$  reactions.

<sup>&</sup> Observed in  $^1\text{H}(^{19}\text{C}, ^{16}\text{C}^*(1.77\text{ MeV})n)$  reactions.

<sup>a</sup> Experimental cross-sections.