

$^{208}\text{Pb}(^{18}\text{C}, ^{17}\text{C})$ [2017He04](#)

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

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The authors studied the Coulomb dissociation of ^{18}C to states in ^{17}C with the aim of gaining insight into the astrophysically important $^{17}\text{C}(n,\gamma)$ radiative neutron capture reaction.

A 425 MeV/nucleon beam of ^{18}C ions was produced at the GSI/FRS facility by fragmenting ^{40}Ar on a thick beryllium target. The beam impinged on a 2145 mg/cm² lead target that was at the center of the Crystal Ball γ -ray array. The momentum of the ^{17}C breakup particles was determined using beam tracking detectors ahead of the target position, magnetic analysis in the ALADiN dipole magnet and a set of position sensitive Si detectors after the magnet. The reaction neutrons were characterized using the position sensitive ToF wall and LAND neutron arrays. The final reaction kinematics were analyzed by considering the $n+^{17}\text{C}$ kinematics along with the γ -rays associated with the kinematic groups. Finally, data on a 935 mg/cm² carbon target permitted an estimate of the nuclear contributions so the Coulomb component could be isolated.

Reactions consistent with Coulomb breakup to $^{17}\text{C}^*(0,0.22,0.33\text{ MeV})$ are observed. The cross sections are analyzed and compared with model calculations to obtain spectroscopic factors. Finally, discussion is given on the thermonuclear reaction rate and the impact on r-process network calculations.

 ^{17}C Levels

E(level) [†]	J π [†]	S	Comments
0	3/2 ⁺	1.18 51	$\sigma=32$ 13(stat) 5(sys) mb, S=1.18 48(stat) 19(sys).
217	1/2 ⁺	0.52 13	$\sigma=40$ 8(stat) 5(sys) mb, S=0.52 11(stat) 7(sys).
331	5/2 ⁺	1.74 24	$\sigma=43$ 6(stat) 1(sys) mb, S=1.74 24(stat) 4(sys).

[†] From [\(2013Ue01\)](#).