^{208}Pb(^{20}N,^{19}Nγ) 2016Ro13

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	C. G. Sheu, J. H. Kelley	ENSDF	21-Aug-2018

2016Ro13: The Coulomb dissociation of ^{20}N was studied at the GSI LAND/R3B facility using a secondary beam produced by fragmenting an 490 MeV/nucleon ^{40}Ar beam. The ^{20}N beam impinged on a 0.176 mm *4* thick natural lead target for the Coulomb excitation measurements, while measurements on a 5.08 mm thick carbon target were used to estimate the nuclear breakup contributions. Reaction γ-rays were detected using the 162 NaI Crystal Ball array; neutrons from Coulomb breakup reactions were detected in the LAND neutron wall array, and the core ejectiles were deflected in the ALADIN magnet and detected and identified in a two-dimension position sensitive plastic scintillator ΔE wall.

Analysis of the γ-ray data from the Crystal Ball indicated the ^{20}N levels populated in the Coulomb excitation reactions neutron decay to ^{19}N*(0,1150) states. The γ-ray spectrum measured in coincidence with n+^{19}N shows a dominant peak with $E_\gamma \approx$ 1150 keV.

The Coulomb dissociation cross section of ^{20}N integrated over 0-20 MeV excitation energy for the total reaction was measured as σ(^{20}N,total)=90 mb *12*; σ(^{20}N,^{19}N$_{g.s.}$)= 15 mb *16*; σ(^{20}N,^{19}N*1150)= 36 mb *6*; σ(^{20}N,^{19}N*(all excited states))=76 mb *10*. The quoted uncertainties are statistical only since the systematic uncertainties from the identification of the incoming particles, from the single neutron detection efficiency of LAND, from the Crystal Ball efficiency and from the measurement of the areal density of the target were negligible compared to the statistical uncertainty.

^{19}N Levels

E(level)†	Comments
0	σ(^{20}N, gs) = 15 mb *16*.
1150	σ(^{20}N, 1150) = 36 mb *6*.
1600	
2500	

† Estimated: multiple unresolved states may be present in Fig 3(a).

γ(^{19}N)

E_γ	E_i(level)	E_f
1150	1150	0
1600	1600	0
2500	2500	0

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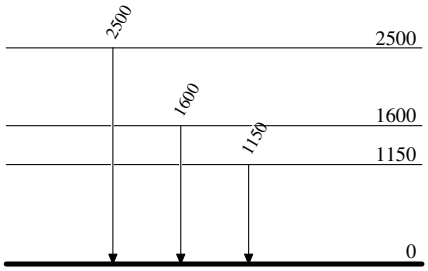
Level Scheme



$^{19}_{7}N_{12}$