^{9}Be(^{22}Ne,^{18}N)

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	R. Spitzer, J. H. Kelley	ENSDF	30-Jun-2021

1994Sc01: ^{18}N produced in the fragmentation of ^{22}Ne on a ^{9}Be target at the NSCL/A1200 were identified via ΔE-E and implanted into a thin plastic scintillator. The scintallator was at the center of a large-area neutron array comprised of 15 curved plastic bars that covered 14.3% of 4π. Activity was collected for 2.14 s before a 2.01 s counting period. β-delayed neutron yields were measured along with the neutron energy spectrum. Neutron energies were determiend by the time-of-flight between a β-particle in the implantation scintillator and a neutron in the array, which was 100.9 cm away. Decay to several ^{17}O levels was observed. %β^-n=2.2 *4* was determined for production of high-energy neutrons above the 1 MeV threshold. $T_{1/2}$=630 ms *20* was determined. See also (1993ShZW).

1997Ne01,1997Co15,1998Ne04: ^{18}N ions, produced by fragmenting a ^{22}Ne beam on a ^{9}Be target using the LISE3 spectrometer, were implanted into a 8 K cooled Mg crystal that was oriented with β=6° and held within a variable magnetic field. Analysis of the asymmetry of the β radiation with field strength over the range 0-2000 Gauss indicated a 14.4% spin alignment.

1999Ne01: Following up on (1997Ne01), a β-level mixing NMR technique (β-LMR) was developed and utilized to determine μ=0.135 μ_N *15*. They also obtained the ratio of the quadrupole interaction frequency to the magnetic moment and determined Q=+27 mb *4*. Results are discussed and compared with shell model calculations.

2005Li60: A thick Be target was bombarded by a 68.8 MeV/nucleon ^{22}Ne beam to produce ^{18}N ions that were selected and stopped in a thin plastic scintillation detector. Two different plastic scintillator arrays (neutron walls) were used to detect delayed neutrons with coverage of 30% and 2.2% of 4π sr for high energy and low energy, respectively. The neutron detection efficiecies were calibrated with the known ^{17}N β^-n decay neutron spectrum. A set of 3 HPGe detectors were positioned around the target to measure γ-ray emissions.

Beam was collected in the target for cycles of 2.0 s activation periods followed by 2.0 s counting periods. The result $T_{1/2}$=619 ms *2* was obtained from analysis of the β-ray decay curve observed in the thin plastic catcher foil; a small 5% ^{20}O ($T_{1/2}$=13.5 s) component was the main active beam contaminant. An exclusive gate on the on the strongest neutron peak at E_n= 0.58 MeV yielded the value $T_{1/2}$=610 ms *23*.

Analysis of the ToF spectrum indicates decays of 11 neutron emitting states in ^{18}O. The total observed Branching is 6.98% *146* for fast neutrons.

2007Lo05: A Be target was bombarded by a 68.8 MeV/nucleon ^{22}Ne beam to produce ^{18}N ions that were selected and stopped in a thin plastic scintillation detector. A neutron sphere composed of eight identical plastic scintillator counters was used to detect delayed neutrons; each segment covered 3.75% of 4π sr. A calibration using ^{17}N provided the neutron detection efficiency up to E_n=1.73 MeV. In this measurement, the emphasis was on fast neutrons. Nine neutron groups were observed, eight are in good agreement with those reported by (2005Li60). The total observed β-delayed Branching is 7.03% *146*.

Three $T_{1/2}$ values were obtained by analyzing the β-time spectra corresponding to the strongest three neutron peaks, 625 ms *30*, 635 ms *40* and 609 ms *60*.

^{18}N Levels

E(level)	$T_{1/2}$	Comments
0	619 ms *2*	μ=(−)0.135 *15* (1999Ne01) Q=+0.027 *4* (1999Ne01) $T_{1/2}$: Half-lives of 630 ms *20* (1994Sc01), 619 ms *2* (2005Li05), and 625 ms *30*, 635 ms *40* and 609 ms *60* (2007Lo05) were determined in this reaction. %β^-n: Analysis of fast neutrons measured by (2005Li60) and (2007Lo05) indicates consistency with %β^-n≥7%.