

$^9\text{Be}(^{48}\text{Ca}, ^{35}\text{Na})$ 2013StZY,2022Cr03

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Lijie Sun and Jun Chen		NDS 211,1 (2026)	30-Sep-2025

2013StZY: ^{35}Na was produced via the projectile fragmentation of a 345-MeV/nucleon, 70-pnA $^{48}\text{Ca}^{20+}$ primary beam from the linear accelerator RILAC and the four cyclotrons RRC, fRC, IRC, and SRC at RIKEN impinging on a 15-mm-thick ^9Be target. The secondary cocktail beam was selected by the BigRIPS separator and the zero-degree spectrometer (ZDS) using the $B\rho$ - ΔE -ToF method, and implanted into the Cylindrical Active Implantation Target for Exotic Nuclei (CAITEN) consisting of a segmented movable hollow-cylindrical-shaped plastic scintillator and a stationary ring of 24 position-sensitive photomultiplier tubes (PSPMTs) arranged on a ring inside the scintillator at the height of the beam line. To reduce background buildup, the scintillator barrel was rotated quickly and axially-moved slowly in vertical direction, resulting in a helix-shaped motion. β particles were detected by the CAITEN and γ rays were detected using three HPGe clover detectors. Measured $E\gamma$, $\beta\gamma$ -coin, and implant- β correlation, and deduced the $T_{1/2}$ of ^{35}Na . Comparisons with QRPA and shell-model calculations.

2022Cr03: ^{35}Na was produced via the projectile fragmentation of a 172.3-MeV/nucleon, 120-pnA $^{48}\text{Ca}^{20+}$ primary beam from the FRIB linac impinging on an 8.89-mm-thick ^9Be target. The secondary cocktail beam centered around ^{42}Si was selected by the ARIS separator and implanted into a 5-mm-thick YSO segmented scintillator sandwiched between two plastic scintillator veto detectors. Surrounding the implantation array were 11 HPGe clover detectors and 15 fast-timing LaBr_3 detectors, and the VANDLE array of 88 neutron detectors. Two Si PIN detectors and a plastic scintillator were placed 1.5 m upstream in the last diagnostic detector box of the beamline. Ions were identified event-by-event by energy loss in the upstream PIN detector (Z determination) and by time-of-flight between a plastic timing scintillator at the start of stage 3 of ARIS and the timing scintillator in the diagnostic detector box (A/Q determination) over a flight path of 33.5 m. Measured implant- β correlation and deduced $T_{1/2}$ of ^{35}Na . Comparisons with QRPA and shell-model calculations.

 ^{35}Na Levels

E(level)	$T_{1/2}$	Comments
0.0	2.1 ms 4	$T_{1/2}$: From the Adopted Levels of ^{35}Na . Values from this dataset: 2.4 ms 3 (stat) 2 (syst) (2022Cr03, implant- β correlation); 2.4 ms 3 (stat) 6 (syst) (2013StZY, implant- β correlation).