^{138}Ba(α,^{3}He) 2008Ka01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	P. K. Joshi, B. Singh, S. Singh, A. K. Jain	NDS 138, 1 (2016)	15-Oct-2016

2008Ka01: E=51 MeV beam provided by Yale tandem accelerator. The reaction products were analyzed with an Enge magnetic split-pole spectrometer. The ^{3}He ions were isolated by a gas-filled ionization chamber and plastic scintillator at the focal plane of the Enge spectrometer and using E-ΔE technique. Angular distributions were measured at 6°, 11°, 20° and 30°. Resolution (FWHM)=70 keV. DWBA analysis of $\sigma(\theta)$ data.

Absolute cross sections have typical uncertainty of ≈7% while relative values are accurate to 5%.

This work focuses on measurement of $i_{13/2}$ and $h_{9/2}$ single- neutron strengths for N=83 nuclides. From cross section data, matrix elements were also deduced for $f_{7/2}\otimes 2^+$ (vibration) and $f_{7/2}\otimes 3^-$ (vibration) configuration mixings. For L=6, configurations of (0^+ core)$\otimes i_{13/2}$ and (3^- core)$\otimes f_{7/2}$; and for L=5, configurations of (0^+ core)$\otimes h_{9/2}$ and (2^+ core)$\otimes f_{7/2}$ have been used for two-level mixing calculations to extract the mixing matrix elements from the measured spectroscopic factors and excitation energies.

^{139}Ba Levels

E(level)[†]	L	C^2S[‡]	Comments
1283.32	5	0.70	dσ/dΩ=0.35 mb/sr at 20°, 0.20 mb/sr at 30°.
1539.01	6	0.60	dσ/dΩ=0.75 mb/sr at 20°, 0.44 mb/sr at 30°.
1619 *10*	5	0.41	dσ/dΩ=0.18 mb/sr at 20°, 0.11 mb/sr at 30°.
3080 *10*	6	0.17	dσ/dΩ=0.27 mb/sr at 6°, 0.21 mb/sr at 11°, 0.12 mb/sr at 20°, 0.08 at 30°.

[†] From Adopted Levels. The values were not determined independently in 2008Ka01. Centroid energies (keV): 1407 *10* for $h_{9/2}$, 1879 *24* for $i_{13/2}$.

[‡] Typical uncertainties are 10% based on relative cross sections and analysis using a variety of optical parameters listed by 2008Ka01. Summed [C^2S]=1.11 *16* for $h_{9/2}$, 0.77 *11* for $i_{13/2}$.