

$^{22}\text{Mg}(\text{p,p})\text{:res}$  2007He30

Type	Author	History	Citation	Literature Cutoff Date
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Based on XUNDL: Compiled by S. Geraedts and B. Singh (McMaster): Nov 16, 2007.

Target=(CH<sub>2</sub>)<sub>n</sub>, Beam= $^{22}\text{Mg}^{12+}$ , E=5.93 MeV/nucleon, produced by bombarding a  $^3\text{He}$  gas target with  $^{20}\text{Ne}^{8+}$  primary beam, E=8.11 MeV/nucleon, at CNS radioactive-ion beam facility at RIKEN. Mean energy of  $^{22}\text{Mg}$  beam was 4.38 MeV/nucleon.

Target=(CH<sub>2</sub>)<sub>n</sub> polyethylene. Measured  $\Delta E$  and time-of-flight of charged particles using  $\Delta E$ -E Si telescopes (at  $\sim 4^\circ$ ,  $17^\circ$ , and  $23^\circ$ ), double-sided Si strips and focal plane detectors. Carbon target was also used to evaluate contributions from carbon in the (CH<sub>2</sub>)<sub>n</sub> target. Overall FWHM=20 keV at 500 keV to 45 keV at 3500 keV excitation energy. R-matrix analysis.

Suffixes p and p' imply the  $^{22}\text{Mg}(\text{g.s.})+\text{p}$  (elastic) and  $^{22}\text{Mg}(2^+)+\text{p}$  (inelastic) channels.

 $^{23}\text{Al}$  Levels

E(level)	$J^\pi$ <sup>†</sup>	$L$ <sup>†</sup>	Comments
0.0	$5/2^+$		$J^\pi$ : From Adopted Levels.
3000 20	$(3/2^+)$	2	Elastic scattering peak. $C^2S(\text{to first excited state})=0.005$ for $1d_{5/2}$ , 0.059 for $d_{3/2}$ , 0.018 for $2s_{1/2}$ . $C^2S(\text{to g.s.})=0.28$ for $1d_{3/2}$ .
3140 30	$(7/2^+, 5/2^+)$	4,2	Main configuration= $0^+ \otimes 1d_{3/2}$ , $0^+$ for $^{22}\text{Mg}$ core g.s. Partial widths: $\Gamma_p=32$ keV 5 for $3/2^+$ , $\Gamma_p=17$ keV 3 for $5/2^+$ . $C^2S(\text{to first excited state})=0.024$ for $1d_{5/2}$ , 0.324 for $d_{3/2}$ . $J^\pi$ : R-matrix analysis fits $7/2, 5/2$ , but negative-parity states of this spin are neither observed in the mirror nucleus $^{23}\text{Ne}$ nor predicted by shell-model. This level may correspond to calculated level at 3605, $7/2^+$ .
3260 30	$(7/2^+, 5/2^+)$	2,0	Main configuration= $2^+ \otimes 1d_{3/2}$ . Partial widths: $\Gamma_p=2-5$ keV, $\Gamma_{p'}=30$ keV 20. Partial widths: $\Gamma_p=2-5$ keV, $\Gamma_{p'}=30$ keV 20. $C^2S(\text{to first excited state})=0.010$ for $1d_{5/2}$ , 0.033 for $d_{3/2}$ , 0.023 for $2s_{1/2}$ . $C^2S(\text{to g.s.})=0.01$ for $1d_{5/2}$ .
3950 30	$(7/2^+)$	2	$C^2S(\text{to first excited state})=0.002$ for $1d_{5/2}$ , 0.180 for $d_{3/2}$ . $J^\pi$ : R-matrix analysis fits $7/2^+, 5/2^-$ , but from systematics of neighboring nuclides $5/2^-$ is unlikely. Main configuration= $2^+ \otimes 1d_{3/2}$ . Partial widths: $\Gamma_p=20$ keV 10, $\Gamma_{p'}=30$ keV 20.

<sup>†</sup> Proposed by 2007He30, based on R-matrix analysis (SAMMY-M6-BETA code) of measured differential cross sections, except otherwise noted.