Liquid Hydrogen Target for the Measurement of Spin Correlation Coefficients in Proton-Proton Scattering at 50 MeV

S. KOBAYASHI, K. NISHIMURA, J. SANADA, D. C. WORTH,
H. IMADA, N. RYU, H. HASAI, K. FUKUNAGA,
S. B. NUNG, and Y. HIRADATE

Institute for Nuclear Study, University of Tokyo,
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A liquid hydrogen target has been constructed to measure spin correlation coefficients in proton-proton scattering at a bombarding energy of 50 MeV. The essential part of the target is 3cm in diameter and 8cm in height, and the evaporation rate of liquid hydrogen was 0.15 liter per hour. The operation of the level control system was very easy and stable. The level of liquid hydrogen was monitored by the change of capacitance of a capacitor which was inserted in the target.

Angular Distributions of Alpha-Particles from F^{19}, Al^{27} and P^{31} bombarded with Protons

Sukeaki YAMASHITA

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The angular distributions of the alpha-particles were obtained for the reactions $F^{19}(p, \alpha)O^{16}$ leaving the residual nucleus in the ground state, $Al^{27}(p, \alpha)Mg^{24}$ and $P^{31}(p, \alpha)Si^{28}$ leaving the residual nuclei in the ground and first excited states at four bombarding energies between 6.0 MeV and 7.4 MeV. The angular distribution for the reaction $F^{19}(p, \alpha)O^{16}$ shows the backward peak at each energy, but at small angles it depends on the bombarding energy. The angular distributions for the reactions $Al^{27}(p, \alpha)Mg^{24}$ and $P^{31}(p, \alpha)Si^{28}$ are also energy-dependent, but contain a larger isotropic part than those for the reaction $F^{19}(p, \alpha)O^{16}$. The integrated cross sections for the reactions $Al^{27}(p, \alpha)Mg^{24}$ and $P^{31}(p, \alpha)Si^{28}$ leaving the residual nuclei in the first excited states are several times as large as those for the reactions leaving the residual nuclei in the ground states. It appears unlikely that these reactions can be accounted for by the formation of compound nucleus or by simple direct interaction. The possible mechanisms through which these reactions may take place are discussed.
