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Study of Stopping Sites of B12 Nuclei Implanted in Hexagonal Single-Crystals

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thicknesses of 100-500 keV and the γ-rays were detected with a 10" x 10" (NaI(Tℓ) detector with anticoincidence shielding. Preliminary results for the excitation function taken between E_α = 31 and 35 MeV shows that the radiative width of the 16.9 MeV state is somewhat larger than that of the 16.6 MeV state. This result is discussed in terms of the isospin mixing between the two levels. Also, a preliminary result has been determined for the total radiative width integrated over the two states. The implications for the Conserved Vector Current theory of weak interactions will be discussed.

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AF 4 Resonance Fluorescence of 3 Levels in ^{11}B.* T. J. LEWIS, Univ. of Pittsburgh, B. WESSELS and W. C. MILLER, Univ. of Notre Dame--Resonant scattering of x-rays has been observed from the 2.125, 4.444, and 5.018 MeV excited states in ^{11}B. The incident radiation was bremsstrahlung produced by bombarding a 2.5 mg/cm^2 Au foil with an electron beam from the Notre Dame FN tandem accelerator. Self-absorption experiments were performed on each level, resulting in determination of level widths. For the 2.125 and 5.018 MeV levels, preliminary widths are fairly consistent with accepted values.[1] For the 4.444 MeV level, a more accurate result of 615±37 meV agrees well with previous measurements.

*Supported by National Science Foundation.

[1]F. Ajzenberg-Selove and T. Lauritsen, Nucl. Phys. A114, 2 (1968).

AF 5 Quadrupole Couplings of ^{12}N implanted in Single Crystals of Be and Mg.* R. C. HASKELL, F. D. CORRELL and L. MADANSKY, The Johns Hopkins University--Measurements have been made of the quadrupole couplings of ^{12}N implanted in single crystals of Be and Mg. A comparison of these couplings suggests that (1) the final stopping sites of the implanted ^{12}N ions are substitutional sites in both Mg and Be, i.e., the ^{12}N ions occupy metal ion lattice positions, and (2) the ^{12}N ions implanted in both Mg and Be have the same charge state and quadrupole shielding factor. A procedure is outlined for deducing Q(^{12}N), and the reliability of this procedure is discussed.

*Work supported by the U. S. Atomic Energy Commission.

AF 6 Beta Decay of ^{14}B.* D. E. ALBURGER and D. R. GOOSMAN, Brookhaven National Laboratory--A target of BeO enriched to 94% in ^{10}Be has been bombarded with 31-MeV ^{6}Li ions and delayed activities were measured by means of a fast beam chopper and a NaI(Tl)-plastic γ-β coincidence detecting system. γ rays of 1.6, 2.1, 3.7, 4.4, and 6 MeV were observed in coincidence with β rays, the first four corresponding to the known activities ^{20}Na, ^{11}Be, ^{13}B, and ^{12}B, respectively. The 6-MeV γ rays are in coincidence with β's having E_{max} > 12 MeV decaying with $T_{1/2}$ = 21 ± 3 msec (preliminary value). This activity is assigned to ^{14}B produced in the ^{10}Be(^{6}Li,2p)^{14}B reaction. It is shown that ^{14}B has odd parity consistent with shell-model expectations, although the β-ray branches to the odd-parity excited states of ^{14}C need further clarification. Work is also continuing in an effort to produce a greater yield of ^{14}B via the ^{10}Be(^{9}Be,pα)^{14}B reaction.

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AF 7 ^{18}O($\vec{p}$,p)^{18}O and ^{18}O($\vec{p}$,p$_1$)^{18}O*(1.98 MeV) for E_p = 4.1-6.1 MeV. R. ALMANZA and G. MURILLO, Instituto Nacional de Energía Nuclear, México, and S.E. DARDEN, S. SEN, AND W.A. YOH, University of Notre Dame.- Vector-analyzing-power measurements have been made for ^{18}O(p,p)^{18}O and for ^{18}O(p,p$_1$)^{18}O*(1.98 MeV) to augment cross-section data already obtained[1] and permit a more complete analysis in terms of levels in ^{19}F. A gas target with an energy spread of approximately 40 keV was used. Data were taken for eighteen angles between 32.5° and 150° lab in 25-keV steps over the range E_p = 4.1 - 6.1 MeV. Analysis of the data is in progress and preliminary results will be presented.

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1 Bull. Am. Phys. Soc. 18, 1390 (1973)

AF 8 A Study of the Stopping Sites of ^{12}B Nuclei Implanted in Hexagonal Single Crystals.*† F. D. CORRELL, R. C. HASKELL and L. MADANSKY, The Johns Hopkins University--A series of experiments to study the stopping sites of ^{12}B nuclei implanted in single crystals of Be and Mg will be discussed. Previous measurements of the quadrupole couplings of ^{12}B in these metals indicated that two different stopping sites existed, one of which produced a negligible quadrupole coupling.

Beta active ^{12}B nuclei are produced via the reaction ^{11}B(d,p)^{12}B and the recoil nuclei are implanted in the Be or Mg. The angles between the recoil direction and the directions of various crystal axes are varied in a systematic way. Preliminary results indicate that the number of nuclei that arrive at sites producing negligible quadrupole couplings changes as the angles are varied, suggesting that some channelling of the slow boron nuclei into these sites occurs. These results and a discussion of the application of the method to the determination of stopping sites will be presented.

*Work supported by the U. S. Atomic Energy Commission.
†Submitted by L. MADANSKY.

AF 9 The ^{15}N(^{3}He,α) ^{14}N Reaction.* C.H. HOLBROW, Colgate University, J. GARRETT† and H. T. FORTUNE, University of Pennsylvania.--Using 18-MeV ^{3}He ions from the University of Pennsylvania Tandem Van de Graaff accelerator the reaction ^{15}N(^{3}He,α)^{14}N was induced in a target of gaseous nitrogen enriched to 99% in ^{15}N. Alpha particle spectra were recorded in 3.75° intervals at 20 reaction angles forward of 90° by means of a multiangle magnetic spectrograph. Angular distributions have been obtained for α-particle groups corresponding to excited states up to 10.43-MeV excitation in ^{14}N. Spectroscopic factors extracted by analysis of the angular distributions with the distorted wave code DWUCK will be reported.

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AF 10 Study of the ^{16}O(^{7}Li,^{3}He)^{20}F Reaction.* J.N.BISHOP, and H.T.FORTUNE, University of Pennsylvania--The ^{16}O(^{7}Li,^{3}He)^{20}F reaction was studied at 24 MeV bombarding energy, using a target of natural O_2 gas contained in a gas cell with no entrance window. The outgoing ^{3}He particles were detected in a multi-angle spectrograph. The reaction is weak and quite nonselective. The largest differential cross section measured for a single state is 16 μb/sr. Angular distributions for center-of-mass angles less than 90° were obtained for the states up to 4 MeV in excitation. Their shapes are not oscillatory. The reaction appears to be dominated by a compound-nucleus mechanism.

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