Energetic Particles from 10B and Li Fusion Reactions

Matney, Miriam

In this investigation, alpha particles from an Am-241 source (approximately 5 MeV) were used to bombard a 10B target (fine powder on a piece of tape) to produce high energy protons and later to create high energy alpha particles with 7Li powder on the opposite side of the tape. For the 10B reaction, a Geiger counter was used to count particles over long periods of time at different amounts of deflection caused by a magnetic field, which corresponds to the energy of the particle. By subtracting off the noise rate for each deflection range and reaction, rates were found for each energy range (based off of the deflection distance). The highest rate of protons produced was in the 10 MeV-20 MeV range. The predicted proton energy value in the forward direction fell near these ranges. The 7Li reaction was measured using varying numbers of aluminum foil sheets. Each aluminum foil thickness corresponded to the maximum distance a certain energy alpha particle can penetrate, so the largest count rate difference per foil thickness difference would correspond to the most abundant energy, which was approximately 19 MeV. A spark device was also used to qualitatively measure the reaction, and some sparks were seen, indicating that alpha particles were being produced. In conclusion, these findings and the continued study of nuclear fusion have numerous energy and fuel applications.

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