^{3}He

In 1934, Oliphant et al. reported the discovery of ^{3}He "Transmutation Effects observed with Heavy Hydrogen" (1934Ol02). Deuterated ammonium chloride, ammonium sulphate, and orthophosphoric acid samples were bombarded with deuterons accelerated by 20 kV at the Cavendish Laboratory in Cambridge, UK, and the range of observed protons were measured. In addition, a large number of neutrons were observed. "It seems more probable that the diplons unite to form a new helium nucleus of mass 4.0272 and 2 charges. This nucleus apparently finds it difficult to get rid of its large surplus energy above that of an ordinary He nucleus of mass 4.0022, but breaks up into two components... Another possible reaction is $D_1^2 + D_1^2 \rightarrow He_2^3 + n_0^1$ leading to the production of a helium isotope of mass 3 and a neutron. In a previous paper we suggest that a helium isotope of mass 3 is produced as a result of the transmutation of Li^6 under proton bombardment into two doubly charged particles. If this last reaction be correct, the mass of He_2^3 is 3.0165, and using this mass and Chadwick's mass for the neutron, the energy of the neutron comes out to be about 3 million volts." The quoted previous paper only suggests the formation of ^{3}He as one possibility (1933Ol01).

Adapted from reference (2012Th01)

1933Ol01 M. L. E. Oliphant, B. B. Kinsey, and L. Rutherford, Proc. Roy. Soc. (London) **141**, 722 (1933).

1934Ol02 M. L. Oliphant, P. Harteck, and E. Rutherford, Nature **133**, 413 (1934).

2012Th01 M. Thoennessen, At. Data Nucl. Data Tables **98**, 43 (2012).

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