Lithium nitride reacts with water to produce ammonia and lithium hydroxide according to the equation

$Li_3N(s) + 3H_2O(l) \rightarrow NH_3(g) + 3LiOH(aq)$

Heavy water is water with the isotope deuterium in place of ordinary hydrogen, and its formula is D_2O. The above reaction can be used to produce heavy ammonia, $ND_3(g)$, according to the equation,

$Li_3N(s) + 3D_2O(l) \rightarrow ND_3(g) + 3LiOD(aq)$

Calculate how many grams of heavy water are required to produce 175.0 mg of $ND_3(g)$. The mass of deuterium, D, is 2.014 g/mol.

Solution

x g   0.175 g
$Li_3N(s) + 3D_2O(l) \rightarrow ND_3(g) + 3LiOD(aq)$
          60 g   20 g
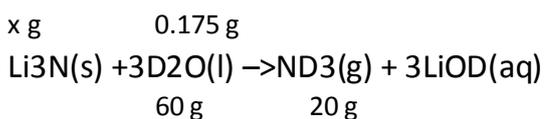
x = 0.175g · 60g/ 20g = 0.525 g

Answer: 0.525 g