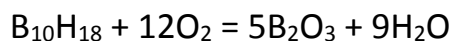


Answer on Question #62272, Chemistry / General Chemistry

1. A scientist studying the reaction between decaborane and oxygen mixed 75.0 g of B₁₀H₁₈ with 145.0 g of O₂. This reaction generates B₂O₃ and H₂O as the only products. Compute how many grams of B₂O₃ are present after the reaction went to completion

Solution:



$$M(\text{B}_{10}\text{H}_{18}) = 10 \times 10.8 + 18 \times 1 = 126 \text{ g/mol}$$

$$n(\text{B}_{10}\text{H}_{18}) = \frac{75.0 \text{ g}}{126 \text{ g/mol}} = 0.595 \text{ mol}$$

$$n(\text{O}_2) = \frac{145.0 \text{ g}}{32 \text{ g/mol}} = 4.531 \text{ mol}$$

We need:

$$n(\text{B}_{10}\text{H}_{18}) : n(\text{O}_2) = 1:12 \text{ (reaction),}$$

we have: 1:7.6.

B₁₀H₁₈ - excess

O₂ – deficit.

$$M(\text{B}_2\text{O}_3) = 70 \text{ g/mol}$$

$$m(\text{B}_2\text{O}_3) = \frac{145.0 \text{ g} \times 5 \times 70 \text{ g/mol}}{12 \times 32 \text{ g/mol}} = 132.161 \text{ g.}$$

Answer: $m(\text{B}_2\text{O}_3) = 132.161 \text{ g.}$