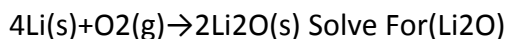


Answer on Question #63136 - Chemistry - General Chemistry

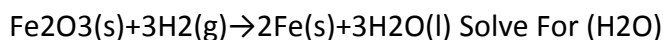
Question:

For each of the following reactions, calculate the grams of indicated product when 18.0 g of the first reactant and 10.2 g of the second reactant is used:

Part A



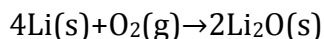
Part B



Solution:

The general principle is to find which component is in shortage. That component will define the amount of product.

Part A.



Per 4 moles of Li we need 1 mole of oxygen and we receive 2 moles of Li_2O .

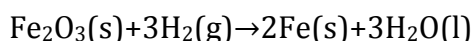
Molar mass of Li - 6.94 g/mol, of oxygen - 32.00 g/mol, of Li_2O - 29.88 g/mol.

So per 27.8 g of Li we need 32.0 g of oxygen to receive 59.8 g of Li_2O , than for 18.0 g of lithium we need $(18.0 \text{ g} * 32.0 \text{ g}) / 27.8 \text{ g} = 20.7 \text{ g}$ of oxygen.

As we have only 10.2 g of oxygen - it is in shortage, so oxygen will define the amount of final product.

32.0 g of oxygen give 59.8 g of lithium oxide, than 10.2 g of oxygen give $(10.2 \text{ g} * 59.8 \text{ g}) / 32.0 \text{ g} = 19.1 \text{ g}$ of lithium oxide.

Part B.



Per 1 mole of Fe_2O_3 we need 3 moles of hydrogen and we receive 3 moles of H_2O .

Molar mass of Fe_2O_3 - 159.7 g/mol, of hydrogen - 2.0 g/mol, of H_2O - 18.0 g/mol.

So per 159.7 g of Fe_2O_3 we need 6.0 g of hydrogen to receive 54.0 g of H_2O , than for 18.0 g of Fe_2O_3 we need $(18.0 \text{ g} * 6.0 \text{ g}) / 159.7 \text{ g} = 0.7 \text{ g}$ of hydrogen. We see that hydrogen is in excess, so Fe_2O_3 is in shortage and it defines the amount of final product.

159.7 g of Fe_2O_3 give 54.0 g of water, than 18.0 g of Fe_2O_3 give $(18.0 \text{ g} * 54.0 \text{ g}) / 159.7 \text{ g} = 6.1 \text{ g}$ of water.

Answer:

Part A: **19.1 g** of lithium oxide.

Part B: **6.1 g** of water.