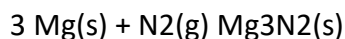


## Answer on Question#71929 – Chemistry – General chemistry

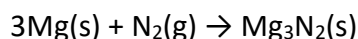
### Question:

Magnesium nitride is formed in the reaction of magnesium metal with nitrogen gas in this reaction:



How many grams of product are formed from 2.0 mol of  $\text{N}_2$  (g) and 8.0 mol of  $\text{Mg(s)}$ ?

### Solution:



1. Determine the limiting reagent:

$$\text{Actual ratio} = \frac{8.0 \text{ mol Mg(s)}}{2.0 \text{ mol N}_2} = \frac{4.0}{1.0}$$

$$\text{Stoichiometric ratio} = \frac{3 \text{ mol Mg(s)}}{1 \text{ mol N}_2(\text{g})} = \frac{3}{1}$$

Actual ratio is greater than stoichiometric ratio, so  $\text{N}_2(\text{g})$  is limiting reagent and  $\text{Mg(s)}$  is in excess.

2. Find how many moles of the product are formed:

$$n(\text{Mg}_3\text{N}_2) = n(\text{N}_2) = 2.0 \text{ mol}$$

3. Find how many mass of the product are formed:

$$m(\text{Mg}_3\text{N}_2) = n(\text{Mg}_3\text{N}_2) \times M(\text{Mg}_3\text{N}_2) = 2.0 \text{ mol} \times 100.95 \frac{\text{g}}{\text{mol}} = 201.9 \text{ g} = 2.0 \times 10^2 \text{ g}$$

### Explanation of significant digits:

Moles of  $\text{N}_2$  are given with two significant digits (**2.0** mol of  $\text{N}_2$  (g)), so the answer have to have two significant digits as well.

201.9 g has four significant digits

$2.0 \times 10^2$  g has two significant digits.

### Answer:

$$2.0 \times 10^2 \text{ g Mg}_3\text{N}_2$$