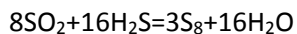


**Answer on Question #40489, Chemistry, Other**

**Task:**

What is the maximum mass of S<sub>8</sub> that can be produced by combining 84.0 g of each reactant?



**Answer:**

$$v = \frac{m}{M}$$

where m-mass, grams;

M-molar mass, gram/mol.

$$M(\text{SO}_2) = 64.1 \text{ g/mol}$$

$$M(\text{H}_2\text{S}) = 34.1 \text{ g/mol}$$

$$v(\text{SO}_2) = \frac{84.0}{64.1} = 1.31 \text{ moles}$$

$$v(\text{H}_2\text{S}) = \frac{84.0}{34.1} = 2.46 \text{ moles}$$

Let's calculate the amount of S<sub>8</sub>, that can be produced from 84.0 grams of each reactant:

$$v(\text{S}_8) = \frac{v(\text{SO}_2)}{8} \cdot 3 = \frac{1.31}{8} \cdot 3 = 0.49 \text{ moles}$$

$$v(\text{S}_8) = \frac{v(\text{H}_2\text{S})}{16} \cdot 3 = \frac{2.46}{16} \cdot 3 = 0.46 \text{ moles}$$

As we can see from the previous calculations, the amount of H<sub>2</sub>S is the determining factor.

There will be an excess amount of SO<sub>2</sub>. That is why:

$$m(\text{S}_8) = v(\text{S}_8) \cdot M(\text{S}_8)$$

$$M(\text{S}_8) = 256.5 \text{ g/mol}$$

That is why the maximum mass of S<sub>8</sub>, that can be produced is equal to:

$$m(\text{S}_8) = 0.46 \cdot 256.5 = 118 \text{ g}$$