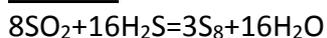


Answer on Question #47826, Chemistry, Other

Task:

What is the maximum mass of S₈ that can be produced by combining 75.0 g of each reactant?

Answer:



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

where m-mass, grams;

M-molar mass, gram/mol.

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

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

$$v(\text{SO}_2) = \frac{75.0}{64.1} = 1.17 \text{ moles}$$

$$v(\text{H}_2\text{S}) = \frac{75.0}{34.1} = 2.2 \text{ moles}$$

Let's calculate the amount of S₈, that can be produced from 75.0 grams of each reactant:

$$v(\text{S}_8) = \frac{v(\text{SO}_2)}{8} \cdot 3 = \frac{1.17}{8} \cdot 3 = 0.44 \text{ moles}$$

$$v(\text{S}_8) = \frac{v(\text{H}_2\text{S})}{16} \cdot 3 = \frac{2.2}{16} \cdot 3 = 0.41 \text{ moles}$$

As we can see from the previous calculations, the amount of H₂S is the determining factor.

There will be an excess amount of SO₂. 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 S₈, that can be produced is equal to:

$$m(\text{S}_8) = 0.41 \cdot 256.5 = 105 \text{ g}$$