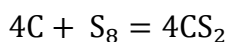


Answer on the question #62753, Chemistry / General chemistry

How many grams of carbon disulfide will be produced if 5.90 g of C and 12.9 g of S₈ are allowed to react completely?

Solution:

Reaction that take place:



To identify who is from the reagents reacts completely we need the mole number value:

$$n(C) = \frac{m(C)}{M(C)} = \frac{5.9 \text{ g}}{12 \text{ g/mol}} = 0.5 \text{ mole}$$

$$n(S_8) = \frac{m(S_8)}{M(S_8)} = \frac{12.9 \text{ g}}{256 \text{ g/mol}} = 0.05 \text{ mole}$$

As we can see from the previous calculations, the mole number of S₈ is less than of C, it means that S₈ reacts completely and C is in excess. That is why the mass of CS₂ calculates from mole number of S₈ (from the law of equivalent):

$$n(CS_2) = 4 \cdot n(S_8) = 4 \cdot 0.05 \text{ mol} = 0.2 \text{ mol}$$

$$m(CS_2) = n(CS_2) \cdot M(CS_2) = 0.2 \text{ mol} \cdot 76 \frac{\text{g}}{\text{mol}} = 15.2 \text{ g}$$

Answer: the mass of CS₂ is 15.2 g.