

Answer on Question #41593, Chemistry, Other

Question

16. 2.4 kg of carbon is made to react with 1.35 kg of aluminium to form Al_4C_3 . Calculate the maximum amount (in kg) of aluminium carbide formed

Answer

The chemical equation is:



Amount of substance, n , for carbon is:

$$n = m/M(\text{C})$$
$$n = 2400/12 = 200 \text{ mole}$$

Amount of substance for aluminium is:

$$n = 1350/27 = 50 \text{ mole}$$

Therefore Al is the limiting reagent.

Amount of substance for Al_4C_3 will be:

$$(1/4)n(\text{Al}) = 50/4 = 12.5 \text{ mole}$$

And the weight of Al_4C_3 will be:

$$m = n * M$$
$$m = 12.5 * 144 = 1800 \text{ g (1.8 kg)}$$

Answer: 1.8 kg