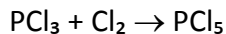


Answer on Question #76110 – Chemistry – Inorganic Chemistry

What mass of PCl_5 will be produced from the given masses of both reactants? 22 g of PCl_3 and 57 g of Cl_2 ?

Solution:



$$(22 \text{ g PCl}_3) \times (1 \text{ mole PCl}_3 / 137.33 \text{ g PCl}_3) = 0.16 \text{ mole PCl}_3$$

$$(57 \text{ g Cl}_2) \times (1 \text{ mole Cl}_2 / 70.91 \text{ g Cl}_2) = 0.80 \text{ moles Cl}_2$$

From the balanced equation, 0.16 mole PCl_3 would react with 0.16 mole Cl_2 . There is more Cl_2 present than that, so Cl_2 is in excess and PCl_3 is the limiting reactant.

The mole ratio of PCl_3 to PCl_5 is 1:1, so 0.16 moles of PCl_5 are theoretically produced.

In grams, that is $(0.16 \text{ moles PCl}_5) \times (208.24 \text{ g PCl}_5 / 1 \text{ mole PCl}_5) = 33.3 \text{ g PCl}_5$

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