

Answer on Question 75200 in General Chemistry

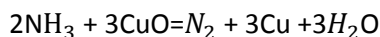
$$.m(\text{NH}_3)=10 \text{ g}$$

$$.m(\text{CuO})=6 \text{ g}$$

$$.m(\text{N}_2)=?$$

Solution:

The reaction between ammonia and copper(ii) oxide



Find the amount of substance of each reagent

$$.n(\text{NH}_3) = \frac{m(\text{NH}_3)}{Mr(\text{NH}_3)} = \frac{10}{17} = 0.59 \text{ mol}$$

$$Mr(\text{NH}_3) = Ar(\text{N}) + 3Ar(\text{H}) = 14 + 3 \times 1 = 17$$

$$.n(\text{CuO}) = \frac{m(\text{CuO})}{Mr(\text{CuO})} = \frac{6}{79.5} = 0.075 \text{ mol}$$

$$Mr(\text{CuO}) = Ar(\text{Cu}) + Ar(\text{O}) = 63.5 + 16 = 79.5$$

$$.n(\text{N}_2) = \frac{1}{3} n(\text{CuO}) = \frac{0.075}{3} = 0.025 \text{ mol}$$

$$.m(\text{N}_2) = n(\text{N}_2) \times Mr(\text{N}_2) = 0.025 \times 28 = 0.7 \text{ g}$$

$$Mr(\text{N}_2) = 2 \times Ar(\text{N}) = 2 \times 14 = 28$$

i) Answer $m(\text{N}_2) = 0.7 \text{ g}$

ii) CuO is the limiting reactant, NH_3 is the excess reactant

iii) For the reaction is used $n(\text{NH}_3) = \frac{2}{3} n(\text{CuO}) = \frac{2}{3} \times 0.075 = 0.05 \text{ mol}$

$n \text{ mol excess } (\text{NH}_3) = n \text{ general} - n(\text{for reaction}) = 0.59 - 0.05 = 0.54 \text{ mol left over}$

Answer provided by AssignmentExpert.com