Answer on Question #81827, Chemistry / General Chemistry

Ammonia can be reacted with carbon dioxide to form urea, as shown below. If 170 g of ammonia were consumed in a reaction with excess carbon dioxide, what mass of urea could be produced?
The molar mass of ammonia is 17 g/mole and that of urea is 60 g/mole.

2 NH3 + CO2 ——> CO(NH2)2 + H2O

Thanks!

Solution

Find amount of substance of ammonia:

n=m/M

$n(NH_3)$ = 170 g/ 17g/mol=10 mol

According to equation 2 mol of NH_3 give 1 mole of $CO(NH_2)_2$.

We have 10 mol of NH_3 that give x mol of $CO(NH_2)_2$

Solve the proportion:

$$\frac{2}{10} = \frac{1}{x}$$

$$x = 5$$

$n(CO(NH_2)_2)$= 5 mol

m=M×n

$m(CO(NH_2)_2)$= 60 g/mol ×5 mol = 300 g

Answer: 300 g