## 36604, Inorganic Chemistry

1. how many grams of Pb are formed when 0.105 g NH3 react
2. If a reaction vessel contains 0.15 moles of LiOH and 0.08 moles CO2 which compound is the limiting reagent
3. Lithium hydroxide absorbs carbon dioxide forming lithium carbonate and water

2 LiOH + CO2 Li2CO3 + H 2 0

## Solution:

1) Lead(II) oxide reacts with ammonia as follows:

3 PbO (s) + 2 $NH_3$ (g) -----> 3 Pb (s) + $N_2$ (g) + 3 $H_2O$

The number of moles $NH_3$ in this reaction is: $n = \frac{0.105}{17} = 0.006 \text{moles}$ .

In accordance with the reaction, if 2 moles of $NH_3$ react 3 moles of Pb will be formed.

So, if react $n = \frac{0.105}{17} = 0.006 \text{moles}$ of $NH_3$ $\frac{0.006 \bullet 3}{2} = 0.009$ moles of Pb will be formed.

Therefore, the mass of Pb is 0.009·207.2=1.865 g.

**Answer: m(Pb)= 1.865 g**

2) Lithium hydroxide reacts with carbon dioxide as follows:

2LiOH + $CO_2$ = $Li_2CO_3$ + $H_20$

So, 2 moles of LiOH react with 1 mole of $CO_2$, or 0.15 moles of LiOH react with $\frac{0.15 \bullet 1}{2} = 0.075$ moles of $CO_2$. Therefore, if a reaction vessel contains 0.15 moles of LiOH and 0.08 moles $CO_2$, LiOH is the limiting reagent.

**Answer: LiOH is the limiting reagent.**