

Announcements – Lecture XXIII – Thursday, Dec 5th

1. Final Exam – Tuesday, December 10th – Marcus 131 – 8:00-10:00 am
Sunday, December 8th – Review , 3:00-5:00pm – ISB 135

2.



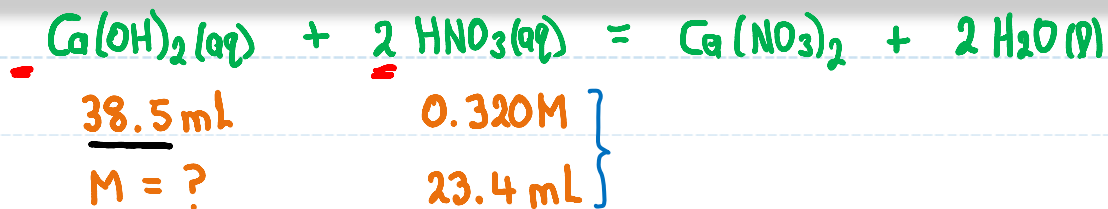
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4.5 Stoichiometry – Lab Owl – Review – Lab Owl 4

Calcium hydroxide is standardized by titration with 0.320 M solution of nitric acid. If 38.5 mL of base are required to neutralize 23.4 mL of acid, what is the molarity of the calcium hydroxide solution?



$$M = \frac{\# \text{ mol}}{V(\text{L})}; \quad \# \text{ mol} = M \times V(\text{L})$$

$$\# \text{ mol HNO}_3 = 0.320 \times 0.0234 = 7.49 \times 10^{-3} \text{ mol}$$

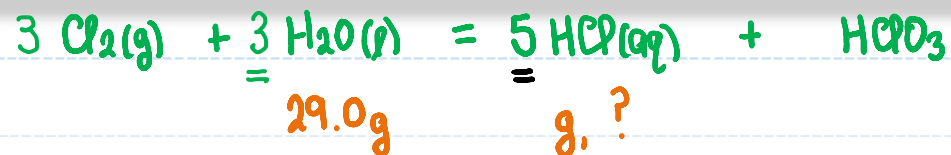
$$\frac{7.49 \times 10^{-3} \text{ mol HNO}_3}{2 \text{ HNO}_3} \left| \frac{1 \text{ Ca(OH)}_2}{2 \text{ HNO}_3} \right. = \frac{3.74 \times 10^{-3} \text{ mol}}{\text{Ca(OH)}_2}$$

$$\text{Ca(OH)}_2: \quad M = \frac{\# \text{ mol Ca(OH)}_2}{V(\text{L})}$$

$$\begin{aligned} M &= \frac{3.74 \times 10^{-3}}{0.0385} \\ &= 0.0972 \end{aligned}$$

4.5 Stoichiometry – Lab Owl – Review – Lab Owl 5

How many grams of hydrochloric acid will be formed upon the complete reaction of 29.0 grams of water with excess chlorine gas?



$$\text{H}_2\text{O} : 2(1.01) + 16.00 = 18.02 \text{ g.mol}$$

$$\frac{29.0\text{g}}{18.02\text{g}} \left| \frac{1 \text{ mol}}{18.02\text{g}} \right. = 1.61 \text{ mol H}_2\text{O}$$

$$\frac{1.61 \text{ mol H}_2\text{O}}{3 \text{ H}_2\text{O}} \left| \frac{5 \text{ HCl}}{3 \text{ H}_2\text{O}} \right. = 2.68 \text{ mol HCl}$$

$$\text{HCl} : 1.01 + 35.45 = \frac{36.46 \text{ g.mol}^{-1}}{1 \text{ mol}} \downarrow \frac{36.46 \text{ g}}{1 \text{ mol}}$$

$$\frac{2.68 \text{ mol HCl}}{1 \text{ mol}} \left| \frac{36.46 \text{ g}}{1 \text{ mol}} \right. = 97.8 \text{ g HCl}$$