

Recitation quiz 3.

Name _____ SHOW WORK!

Helpful molar masses: H₂, 2.02 Al, 27.0 HCl, 36.5 AlCl₃, 133.3.

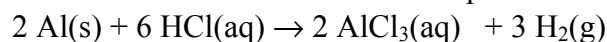
1. A solution is prepared that is calculated to contain 100. grams of HCl in a total volume of 300. mL.

A. What is the molarity of this HCl solution?

B. HCl is often sold as 12 molar, which is too strong to use in many applications.

To prepare a 2.0 molar solution of HCl with a total volume of 150. mL, how many mL of 12 molar HCl are required?

C. Aluminum can be reacted with HCl to produce AlCl₃ and H₂ gas.



1. In excess HCl, how many grams of aluminum are required to produce 24.24 grams of H₂ gas?

2. Using the same equation, $2 \text{ Al(s)} + 6 \text{ HCl(aq)} \rightarrow 2 \text{ AlCl}_3\text{(aq)} + 3 \text{ H}_2\text{(g)}$, suppose 2.70 grams of Al(s) are added to 100. mL of 2.00 molar HCl.

a) Identify the limiting factor, showing work.

b) How many grams of H₂ gas are produced, assuming the reaction goes to completion?

c) In fact, because of impurities in the aluminum, the % yield in this reaction may be only 80 %. In that case, if 0.100 mole of Al is reacted in excess acid, how many moles of H₂ are produced?