

Feb 3, 2005 Group Quiz #1

Consider the rxn of Zn(s) with HCl to form ZnCl₂ + H₂(g)

a) get the MW's MM's: Zn=63.4, HCl=36.5, ZnCl₂=136.3, H₂ = 2.02

b) write the balanced equation. Zn+2HCl -> ZnCl₂+H₂

c) if we mix 5.0 g of Zn with 4.0 g of HCl, which is the limiting reagent?

#g Zn needed = 4.0 g HCl (1mol HCl/36.5gHCl)(1molZn/2molHCl)(63.4gZn/molZn)=3.5 gZn < 5gZn

so Zn in excess and HCl is limiting.

d) if we mix 5.0 g of Zn with 4.0 g of HCl, how many grams of ZnCl₂ will form?

use only limiting reagent:

#g ZnCl₂ = 4.0g HCl(1mol HCl/36.5gHCl)(1molZnCl₂/2molHCl)(136.3gZnCl₂/molZnCl₂)=7.47 g ZnCl₂

e) if we mix 5.0 g of Zn with 4.0 g of HCl, how many L of H₂ will form (assuming 1 mole gas= 22.4 L)#L H₂=4.0g HCl (1mol/36.5gHCl)(1mol H₂/2 mol HCl)(22.4L/mol)=1.23L H₂

f) if we mix 5.0 g of Zn with 4.0 g of HCl, and the % yield is 75%, how many grams of ZnCl₂ will form?

theoretical yield = 7.47g ZnCl₂. %yield = actual(x100%)/theoretical; actual = (75%)(7.47g)/100% = 5.60g