Answer on Question #55504 - Chemistry - General chemistry

Question:

When NaOH(aq) is mixed with CuSO4(aq) a precipitate forms. Based on solubility guidelines the formula of the precipitate is _____.

Express your answer as a chemical formula. What is the identity of the precipitate that forms when 45 mL of 0.3 M HCl reacts with 40 mL of 0.35 M AgNO3? Express your answer as a chemical formula. What volume of 0.245 M H2SO4 is needed to react with 55.2 mL of 0.120 M NaOH? The equation is H2SO4(aq)+2NaOH(aq)→Na2SO4(aq)+2H2O(l)

Solution

The formula of the precipitate is **$Cu(OH)_2(s)$**

The reaction of precipitate formation:

$NaOH(aq) + CuSO_4(aq) = Cu(OH)_2(s) + Na_2SO_4(aq)$

When 45 mL of 0.3 M HCl reacts with 40 mL of 0.35 M $AgNO_3$ the precipitate of **AgCl(s)** is forming:

$AgNO_3(aq) + HCl(aq) = AgCl(s) + HNO_3(aq)$

For the reaction $H_2SO_4(aq)+2NaOH(aq)→Na_2SO_4(aq)+2H_2O(l)$ amount of NaOH given is

n(NaOH) = 0.120x0.0552 = 0.006624 mol;

the amount of sulfuric acid required is n(H2SO4) = =n(NaOH)/2 = 0.003312 mol. On the other hand, $n(H_2SO_4) = c(H_2SO_4)V(H_2SO_4)$;

$V(H_2SO_4) = n(H_2SO_4)/c(H_2SO_4) = 0.003312/0.245 =$ **0.0135 L**

Answer: $Cu(OH)_2(s)$; AgCl(s); 0.0135 L