Redox Stoich solutions

1. 22.25 ml)(0.0123 M MnO4-1 (5Fe/1 MnO4-1 )(55.85 g/mol) = 0.0748 g Fe

0.0748/0.598 x 100 = 13.1 %

1. Equation should be 2S2O3-2 + I2 🡪 2I-1 + S4O6-2

X g Na2S2O3 = 40.21 ml)(0.246 M)(2 S2O3-2/1 I2)(158.1 g/mol Na2S2O3 = 3.128 g ; 3.128g/3.232 g total x 100 = 96.8% pure

1. Oxidation numbers: Na+1, I -1, H+1, S in sulfate +6, Mn in MnO2+4, I2 = 0, Mn+2 in MnSO4. Oxidizing agent is thing reduced MnO2, Reducing agent is thing oxidized. I-1 goes to I2

Need LR: x g I2 = 20 g NaI(1 mole NaI/149.9 g) (I2/2NaI)(253.8 g I2) = 16.93 g I2

x g I2 = 10 g MnO2 (1 mol MnO2/86.94 g MnO2)(1/1)(253.8 g I­2)= 29.19 g I2

NaI limits so 16.93 g I2 produced

1. 26.32)(0.101M Na2S2O3 (1I3-1/2 S2O3-2)(2Cu/1I3-1)(63.55mg Cu/mol Cu) = 0.1689 g Cu; 0.1689 g/0.251 g x 100 % = 67.3 %
2. (47.20 ml )(0.02240 M MnO4-1 = 1.057 mmol MnO4-1

1.057 mmol MnO4-1(5 Fe+2/MnO4-1) = 5.285 mmol Fe (55.85mg/mol) = 295.2 mg or 0.2952 g/0.8890 g sample x 100 = 33.2%

6. 15.2 mL)(0.103 M) MnO4-1 (5 H2O2/2MnO4-1) = 3.914 mmol/10.00 mL =

0.391 M H2O2

7. Change 51.250 g to read 51.250 mg

28.42 mL)(0.9216 M) Cr2O7-2 = 25.94 mmol Cr2O7-2(3SO3-2/Cr2O7-2) =

77.81 mmol SO3-2 (126.04 mg/mmol) = 9.807 mg of NaSO3 in 25 mL

Multiply by 4 to get total in 100 mL = 39.23 mg

39.23 mg/51.259 mg X 100% = 76.5 %

8. Ratio of Cr2O7-2 to Fe+2 is 6 Fe:1 Cr2O7-2 (do equation)

29.3 mL )(0.0325 M) Fe+2 (1Cr2O7-2/6Fe+2) = 0.158 mmol/ 23.8 mL =

0.00667 M Cr2O7-2 solution.

You need 14 times that amount of acid (See EQ)

so 2.21 mmol/0.100 M = 22.1 mL acid

9. 8H+ + MnO4-1 + 5Fe+2 🡪 5Fe+3 + Mn+2 + 4 H2O

23.2mL)(0.0194 M) MnO4-1 (5Fe/1MnO4-1)(55.85 mg/mmol) = 126.2 mg Fe

126.2 mg/279.2 mg x 100 = 45.2 %

10. CrO4-2 + 2 SO3-2 🡪 CrO2-2 + 2SO4-2 (water and H+ all cancel)

3.18 g Na2SO3(1 mol/126.04 g)(1CrO4-2/2 SO3-2) = 0.0126 mol CrO4-2

0.0126 mol CrO4-2 = 0.0126 mol Cr(52.00 g Cr/mol Cr) = 0.656 g Cr

0.656g/3.450 g total x 100% = 19.0 %

11. 14H+ + Cr2O7-2 + 3 Sn+2 🡪 3 Sn+4 + 2 Cr+3 + 7 H2O

0.368 g/261.96 g/mol(3 mol Sn)(118.70 g/mol) = 0.500 g Sn

0.500 g /1.500 g x 100% = 33.3 %

12. 21.62mL (0.100M) (5C2O4-2/2MnO4-1)(110.98 g CaCl2/ mol CaCl2) =

0.600 g CaCl2/ 2.403 g total x 100% = 24.96%

12d Should uses same equation given.

0.1224 g)(1 mol K2C2O4 /166.22g K2C2O4)(2MnO4-1/5C2O4-2) =

0.000736 mol MnO4-1/0.01393 L = 0.0529 M KMnO4 solution