Chemistry 141 Name key

Dr. Cary Willard

Quiz 3a (20 points) September 11, 2013

Exactly 250.0 mL of 0.1532 M hydrochloric acid was added to a beaker containing 175.0 mL of 0.1044 M lead(II) nitrate. Write and balance the equation for the reaction that occurs. (Remember that lead(II) chloride is insoluble.) Use an IE table to solve the problem.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | x=19.10 mmol |  | x=18.27 mmol |  |  |  |  |
|  | 2 HCl | + | Pb(NO3)2 | 🡪 | PbCl2 | + | 2 HNO3 |
| I | 38.30 mmol |  | 18.27 mmol |  | 0 mmol |  | 0 mmol |
|  | -2x |  | -x |  | +x |  | +2x |
| E | 38.30-2x  =1.56 mmol |  | 18.27-x  =0 mmol |  | x  =18.27 mmol |  | 2x  =36.54 mmol |

1. Which reactant is limiting?

Lead nitrate

1. What is the value of x?

18.27 mmol

1. Determine the mass of PbCl2 produced by the reaction.
2. Determine the number of moles and the concentrations of the following ions in solution

Mol Pb+2 = \_\_\_\_\_0 mol \_\_\_\_\_\_\_\_\_ [Pb+2] = \_\_\_\_~ 0 M\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Mol H+1 = (0.00176+0.03654)=0.03830 mol [H+1] = \_\_\_\_\_0.09012 M\_\_\_\_\_\_\_\_\_\_\_\_

Mol Cl-1 = \_\_\_\_\_\_0.00176 mol\_\_\_\_ [Cl-1] = \_\_\_\_\_0.00414 M\_\_\_\_\_\_\_\_\_\_\_\_

Mol NO3-1 = \_\_\_0.03654 mol \_\_\_\_\_ [NO3-1] = \_\_\_\_0.08598 M \_\_\_\_\_\_\_\_\_\_

1. Determine the pH of the final solution. pH = 1.0452

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Quiz 3b (20 points) September 11, 2013

Exactly 150.0 mL of 0.1532 M hydrochloric acid was added to a beaker containing 175.0 mL of 0.1044 M lead(II) nitrate. Write and balance the equation for the reaction that occurs. (Remember that lead(II) chloride is insoluble.) Use an IE table to solve the problem.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | x=11.49 mmol |  | x=18.37 mmol |  |  |  |  |
|  | 2 HCl | + | Pb(NO3)2 | 🡪 | PbCl2 | + | 2 HNO3 |
| I | 22.98 mmol |  | 18.27 mmol |  | 0 mmol |  | 0 mmol |
|  | -2x |  | -x |  | +x |  | +2x |
| E | 22.98-2x  =0 mmol |  | 18.27-x  =6.78 mmol |  | x  =11.49 mmol |  | 2x  =22.98 mmol |

1. Which reactant is limiting?

Hydrochloric acid

1. What is the value of x?

11.49 mmol

1. Determine the mass of PbCl2 produced by the reaction.
2. Determine the number of moles and the concentrations of the following ions in solution

Mol Pb+2 = \_\_\_0.00678 mol\_\_\_\_\_ [Pb+2] = \_\_\_\_\_0.0209 M\_\_\_\_\_\_\_\_\_\_\_\_\_

Mol H+1 = \_\_\_\_0.02298 mol\_\_\_\_\_ [H+1] = \_\_\_\_\_0.07071 M\_\_\_\_\_\_\_\_\_\_\_\_\_

Mol Cl-1 = \_\_ ~0 mol\_\_\_\_\_\_\_ [Cl-1] = \_\_\_\_\_\_~ 0 M\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Mol NO3-1 = 2(.00678)+.02298=0.03674 mol \_ [NO3-1] = \_\_\_\_\_\_\_0.1124 M\_\_\_\_\_\_\_\_\_\_

1. Determine the pH of the final solution. pH = 1.1505