Chemistry 115 Name Key

Dr. Cary Willard

Quiz 3a (20 points) February 18, 2010

Must show all work to receive credit. Use proper significant figures.

1. (5 points) A piece of a copper alloy was weighed and found to have a mass of 45.342g. It was then dropped into a graduated cylinder containing 25.0 mL of water. The level of the water rose to 38.2 mL. What is the density of the alloy?

$$volume copper alloy=38.2 mL-25.0 mL=13.2 mL$$

$$density alloy=\frac{mass Cu alloy}{vol Cu alloy}=\frac{45.342 g Cu alloy}{13.2 mL}=$$

1. (5 points) A new element was discovered at Grossmont College. It is named grossmontonium and has the elemental symbol Gr. If there are two isotopes of Gr with the masses and abundances given in the table below, calculate the weighted average mass of grossmontonium.

|  |  |  |
| --- | --- | --- |
| Grossmont-625 | 624.99 amu | 25.33% |
| Grossmont-629 | 628.99 amu | 74.67% |
|  | Mass 1 atoms | # atoms in 100 atom sample | Mass in a 100 atom sample |
| Gr-625 | 624.99 amu | 25.33 | 15830 amu |
| Gr-629  | 628.99 amu | 74.67 | 46970 amu |
| Total  |  |  | 62800 amu |
|  |  |  |  |
| Average mass 1 atom |  |  | 628.0 amu |

1. (3 points) Fill in the chart below

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Number protons | Number neutrons | Number electrons | Atomic number | Mass number | isotopic notation $\left(\right)$ |
| 45 | 71 | 45 | 45 | 116 | $$$$ |
| 56 | 84 | 54 | 56 | 140 | $$$$ |

1. (3 points) John Dalton developed his Atomic Theory in the 1800’s. Write one of the tenets of his theory.

Elements composed of atoms

1. (4 points) Describe the experiment done to determine that the protons and neutrons were located in the nucleus of an atom.

Rutherford shot alpha particles at a thin gold foil and found that most went straight through and some were deflected indicating the presence of a dense nucleus surrounded by mostly empty space.

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$$volume copper alloy=38.2 mL-25.0 mL=13.2 mL$$

$$density alloy=\frac{mass Cu alloy}{vol Cu alloy}=\frac{62.342 g Cu alloy}{13.2 mL}=$$

1. (5 points) A new element was discovered at Grossmont College. It is named grossmontonium and has the elemental symbol Gr. If there are two isotopes of Gr with the masses and abundances given in the table below, calculate the weighted average mass of grossmontonium.

|  |  |  |
| --- | --- | --- |
| Grossmont-444 | 443.99 amu | 65.33% |
| Grossmont-447 | 446.99 amu | 34.67% |
|  | Mass 1 atoms | # atoms in 100 atom sample | Mass in a 100 atom sample |
| Gr-444 | 443.99 amu | 65.33 | 29010 amu |
| Gr-447 | 446.99 amu | 34.67 | 15500 amu |
| Total  |  |  | 44510 amu |
|  |  |  |  |
| Average mass 1 atom |  |  | 445.1 amu |

1. (3 points) Fill in the chart below

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Number protons | Number neutrons | Number electrons | Atomic number | Mass number | isotopic notation $\left(\right)$ |
| 72 | 106 | 71 | 72 | 178 | $$$$ |
| 20 | 28 | 18 | 20 | 48 | $$$$ |

1. (3 points) John Dalton developed his Atomic Theory in the 1800’s. Write one of the tenets of his theory.

Elements composed of atoms

1. (4 points) Describe the experiment done to determine that the protons and neutrons were located in the nucleus of an atom.

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