

INTRODUCTION TO NATURAL SCIENCE

CHEMISTRY H.W - WEEK 2 - FALL 2006

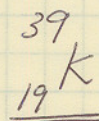
Chapter 2

(9) (a) Mg  $\begin{matrix} (\underline{P} + \underline{N}) \\ 12 + 15 = \underline{\underline{27}} \end{matrix}$

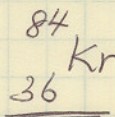
(b) Ti  $22 + 26 = \underline{\underline{48}}$

(c) Zn  $30 + 32 = \underline{\underline{62}}$

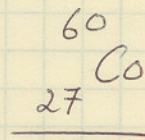
(11) (a) K  $\begin{matrix} (\underline{N} + \underline{P}) \\ A = 20 + 19 = 39 \end{matrix}$



(b) Kr  $A = 48 + 36 = 84$



(c) Co  $A = 33 + 27 = 60$



(14)

	P	$\bar{e}$	n
(a) $\begin{matrix} 13 \\ \text{C} \\ 6 \end{matrix}$	6	6	7
(b) $\begin{matrix} 63 \\ 29 \\ \text{Cu} \end{matrix}$	29	29	34
(c) $\begin{matrix} 205 \\ 83 \\ \text{Bi} \end{matrix}$	83	83	122

(17)

n	P	A	
30	27	57	$\begin{matrix} 57 \\ 27 \\ \hline \text{Co} \end{matrix}$
31	27	58	$\begin{matrix} 58 \\ 27 \\ \hline \text{Co} \end{matrix}$
33	27	60	$\begin{matrix} 60 \\ 27 \\ \hline \text{Co} \end{matrix}$

(19) Since atomic weight (204.4) is closer to 205 than to 203, the  $^{205}\text{Tl}$  isotope must be more abundant.

$$\text{(21) atomic } \left. \begin{array}{l} \text{mass} \\ \text{weight} \end{array} \right\} \text{ of Li} = \frac{(7.50 \times 6.015121 + 92.50 \times 7.016003) \text{ amu}}{100}$$

$$= \underline{\underline{6.94 \text{ amu}}}$$

$$\text{(25) } {}^{60}\text{Ga} \quad 68.9257 \text{ amu}$$

$${}^{71}\text{Ga} \quad 70.9249 \text{ amu}$$

$$\text{atomic mass of Ga} = 69.723 \text{ amu}$$

If the abundance of  ${}^{60}\text{Ga} = x\%$ , then the abundance of  ${}^{71}\text{Ga} = (100-x)\%$ .

$$69.723 \text{ amu} = \frac{\{x [68.9257] + (100-x) (70.9249)\} \text{ amu}}{100}$$

$$6972.3 = 68.9257x + 7092.49 - 70.9249x$$

$$1.9992x = 120.19$$

$$x = 60.119$$

Natural abundance of  ${}^{60}\text{Ga} = \underline{\underline{60.119\%}}$

$$\text{—————} \quad \text{—————} \quad {}^{71}\text{Ga} = 100 - x = \underline{\underline{39.881\%}}$$

$$27) (a) 2.5 \text{ mol Al} \times \frac{26.9815 \text{ g}}{1 \text{ mol Al}} = 67.45 \text{ g} = \underline{\underline{68 \text{ g}}}$$

$$(b) 1.25 \times 10^{-3} \text{ mol Fe} \times \frac{55.845 \text{ g}}{1 \text{ mol Fe}} = \underline{\underline{6.98 \times 10^{-2} \text{ g}}}$$

$$(c) 0.015 \text{ mol Ca} \times \frac{40.078 \text{ g}}{1 \text{ mol Ca}} = \underline{\underline{6.0 \times 10^{-1} \text{ g}}}$$

$$(d) 653 \text{ mol Ne} \times \frac{20.1797 \text{ g}}{1 \text{ mol Ne}} = \underline{\underline{1.32 \times 10^4 \text{ g}}}$$

$$29) (a) 127.08 \text{ g Cu} \times \frac{1 \text{ mol}}{63.546 \text{ g}} = \underline{\underline{1.9998 \text{ mol}}}$$

$$(b) 0.012 \text{ g Li} \times \frac{1 \text{ mol}}{6.941 \text{ g}} = \underline{\underline{1.7 \times 10^{-3} \text{ mol}}}$$

$$(c) 5.0 \text{ mg Am} \times \frac{1 \text{ mol}}{243.061 \text{ g}} \times \frac{1 \text{ g}}{1000 \text{ mg}} = \underline{\underline{2.1 \times 10^{-5} \text{ mol}}}$$

$$(d) 6.75 \text{ g Al} \times \frac{1 \text{ mol}}{26.9815 \text{ g}} = \underline{\underline{0.250 \text{ mol}}}$$

$$31) (a) 1.0 \text{ g He} \times \frac{1 \text{ mol}}{4.0026 \text{ g}} \times \frac{6.02 \times 10^{23} \text{ atoms}}{1 \text{ mol}} = 1.5 \times 10^{23} \text{ atoms}$$

$$(b) 1.0 \text{ g Fe} \times \frac{1 \text{ mol}}{55.845 \text{ g}} \times \frac{6.02 \times 10^{23} \text{ atoms}}{1 \text{ mol}} = 1.1 \times 10^{22} \text{ atoms}$$

$$(c) 1.0 \text{ g Li} \times \frac{1 \text{ mol}}{6.941 \text{ g}} \times \frac{6.02 \times 10^{23} \text{ atoms}}{1 \text{ mol}} = 8.7 \times 10^{22} \text{ atoms}$$

$$\# (d) 1.0 \text{ g Si} \times \frac{1 \text{ mol}}{28.0855 \text{ g}} \times \frac{6.02 \times 10^{23}}{1 \text{ mol}} = 2.1 \times 10^{22} \text{ atoms}$$

$$(e) 1.0 \text{ g C} \times \frac{1 \text{ mol}}{12.011 \text{ g}} \times \frac{6.02 \times 10^{23}}{1 \text{ mol}} = 5.0 \times 10^{22} \text{ atoms}$$

The sample contains the largest number of atoms. Fe sample contains the smallest.

33

63.546 amu can convert this to g also

$$63.546 \text{ amu} \times \frac{1.6605 \times 10^{-24} \text{ g}}{1 \text{ amu}} = \underline{\underline{1.0552 \times 10^{-22} \text{ g}}}$$