

Average Atomic Mass Practice

1. Rubidium is a soft, silvery-white metal that has two common isotopes, ^{85}Rb and ^{87}Rb . If the abundance of ^{85}Rb is 72.2% and the abundance of ^{87}Rb is 27.8%, what is the average atomic mass of rubidium?

$$(85)(.722) + (87)(.278) = 61.4 + 24.2 = 85.6 \text{ amu}$$

2. Uranium is used in nuclear reactors and is a rare element on earth. Uranium has three common isotopes. If the abundance of ^{234}U is 0.01%, the abundance of ^{235}U is 0.71%, and the abundance of ^{238}U is 99.28%, what is the average atomic mass of uranium?

$$(234)(.0001) + (235)(.0071) + (238)(.9928) = .02 + 1.7 + 236.3 = 238.0 \text{ amu}$$

3. Naturally occurring chlorine that is put in pools has two isotopes - ^{35}Cl (mass = 34.969 amu) and ^{37}Cl (mass = 36.966 amu). Calculate the relative abundance of each isotope.

$$\begin{aligned} 35.45 &= (34.969)(x) + (36.966)(1-x) \\ 35.45 &= 34.969x + 36.966 - 36.966x \\ +1.52 &= +1.997x \\ x &= .761 \end{aligned}$$

$^{35}\text{Cl} = 76.1\%$
 $^{37}\text{Cl} = 23.9\%$

4. There are three isotopes of magnesium. Magnesium-24 has a mass of 23.985 amu. Magnesium-25 has a mass of 24.986 amu and is 10.00% abundant. Magnesium-26 has a mass of 25.983 amu. What are the percent abundances of Magnesium-24 and Magnesium-26?

$$24.30 = (23.985)(.9-x) + (24.986)(.10) + (25.983)(x)$$

~~23.985~~

$$24.30 = 21.587 - 23.985x + 2.499 + 25.983x$$

$$24.30 = 24.0855 + 1.998x$$

$$.2145 = 1.998x$$

$$.107 = x$$

$$\text{Mg-26} = 10.7\%$$

$$\text{Mg-24} = 79.3\%$$