Tuesday, September 1, 2020 8:11 PM

### Percent Abundance of an Isotope Example

The average atomic weight of oxygen (O) is 15.9994 amu. It has three naturally occurring isotopes, 160, 170 and 180, and 0.037 percent of oxygen is made up of 170. If the atomic weights are 160 = 15.995 amu, 170 = 16.999 amu and 180 = 17.999 amu, what are the abundances of the other two isotopes?

#### Known:

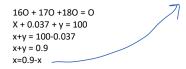
Molecule	Mass (amu)	Percent (%)
0	15.999	100%
160	15.995	х
170	16.999	0.037
180	17.999	х

Find: Percent abundance for 160 and 180?

## Steps:

#### 1) Define a Variable

Set one of the unknown abundances: 160 = xSubtract Known Percentages: 0 - 170 = 100 - 0.037 = 99.963 /100 = 0.99963The other unknown abundance 180 = y = 0.99963 - x.



### 2) Set up an Equation

(atomic weight of 160)  $\bullet$  (fractional abundance of 160) + (atomic weight of 170)  $\bullet$  (fractional abundance of 170) + (atomic weight of 180)  $\bullet$  (fractional abundance of 180) = 15.9994

 $(15.995) \bullet (x) + (16.999) \bullet (0.0037) + (17.999) \bullet (0.99963 - x) = 15.9994$ 

#### 3) Solve for X

 $15.995x - 17.999x = 15.9994 - (16.999) \bullet (0.00037) - (17.999) (0.99963)$  X = 0.9976 160 = 0.9976 \* 100% = 99.76%

#### 4) Solve for Other Variable

180 = 0.99963 - x X = 0.9976 180 = 0.99963 - 0.9976 = 0.00203 180 = 0.00203 \* 100% = 0.203%

# Answer:

16O = 99.76% 17O = 0.037% 18O = 0.203%

Source: https://sciencing.com/calculate-percent-abundances-8267267.html