

**Question #72797, Chemistry / General Chemistry | for confirmation**

In nature, the element X consists of two naturally occurring isotopes.  $^{107}\text{X}$  with abundance 55.34% and isotopic mass 106.9051 amu and  $^{109}\text{X}$  with isotopic mass 108.9048 amu. Use the given information to calculate the atomic mass of the element X to an accuracy of .001% (Report your answer like this yyy.yyyy)

**Solution**

«W» is the mass fraction (abundance) of the isotope (%);

$$W(^{107}\text{X}) = 55.34\%$$

$$W(^{109}\text{X}) = 100 - 55.34 = 44.66\%$$

Ar – the relative atomic mass (a.m.u.) of the element.

$$\text{Ar}(^{107}\text{X}) = 106.9051 \text{ amu};$$

$$\text{Ar}(^{109}\text{X}) = 108.9048 \text{ amu};$$

$$\text{ArX} = W(^{107}\text{X}) \cdot \text{Ar}(^{107}\text{X}) + W(^{109}\text{X}) \cdot \text{Ar}(^{109}\text{X})$$

$$\text{ArX} = 106.9051 \cdot 0.5534 + 108.9048 \cdot 0.4466 = 59.1528 + 48.6354 = 107.7882 \text{ amu};$$

**Answer: 107.7882**