

- Explain why relative atomic masses are not always close to an integer. For example, copper has a reported value of 63.54.

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Many elements consist of isotopes, *i.e.* atoms with different numbers of neutrons and hence different atomic masses. The atomic mass of each isotope is close to an integer value. The relative atomic mass of an element is calculated using all these different isotopic masses and their relative percentages.

- Analysis of a black-coloured mineral called pitchblende returned the following percentage composition by weight: 84.80% uranium and 15.20% oxygen. What is the empirical formula of this compound?

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The mineral contains 84.80% U and 15.20% O.

	U	O
percentage	84.80	15.20
divide by atomic mass	$\frac{84.80}{238.03} = 0.356$	$\frac{15.20}{16.00} = 0.950$
divide by smallest value	1	2.67

The ratio of U : O is 1 : 2.67. The simplest whole number ratio can be obtained by multiplying this by 3 to give U : O equal to 3 : 8.

The empirical formula is U₃O₈.

Answer: U₃O₈