

**Answer on question #61845 Chemistry, General Chemistry**

**A sample of metallic element X, weighing 4.315 g, combines with 0.4810 L of Cl<sub>2</sub> gas to form the metal chloride with the formula XCl (1 to 1 ratio). The density of Cl<sub>2</sub> gas under these conditions is 2.948 g/L. The atomic weight of chlorine is 35.453 amu. What is the identity of X? Enter your answer in symbol form.**

**Answer:**

Density = mass/volume  $d = m/v$

so  $m = d \cdot v = 2.984 \times 0.4810 = 1.44 \text{ g}$

Which is  $1.44/35.453 = 0.04 \text{ moles}$

Since they react in 1:1 ratio it means that 0.04 moles of X was reacted

Therefore atomic mass of X is  $1/0.04 \cdot 4.315 = 107.87$

This exactly corresponds to silver, Ag. Therefore XCl is AgCl.

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