Answer on Question #62659 - Chemistry – Other

Task:

Aspirin manufactured since 1899 is the most well-known pain killer of our days. The chemical name of the active pain-killing ingredient in aspirin is acetylsalicylic acid.

Formula of aspirin: $C_9H_8O_4$ (Relative Atomic masses: C = 12, H = 1, O =16) Solubility of acetylsalicylic acid: 1 g / 100 g water at 37oC

a. Calculate in g the mass of one mole of aspirin

Solution:

$$Amount\ mole\ of\ aspirin = \frac{mass\ of\ aspirin\ in\ g}{molar\ mass\ of\ aspirin\ in\ {}^{g}/_{mol}};$$

The molar mass is the sum of all the atoms present in one mole of a compound. Since the molecular formula of aspirin is $C_9H_8O_4$, we need to add up the atomic weights of all the elements present in it:

Carbon (9 atoms) = 12x9 = 108

Hydrogen (8 atoms) = 1x8 = 8

Oxygen (4 atoms) = 16x4 = 64

To obtain the molar mass of aspirin, simply add up all the values given above;

Molar mass of aspirin = 108+8+64 = 180 (g/mol).

Then,

$$One\ mole\ of\ aspirin = \frac{mass\ of\ aspirin\ in\ g}{180\ {}^{g}/_{mol}};$$

$$the\ mass\ of\ one\ mole\ aspirin = 180\frac{g}{mol} \times 1 mole = 180 g.$$

Answer: 180 g the mass of one mole of aspirin.