Geoffrey used 2.498 g of a mixture of $CuSO_4 \cdot 5H_2O$ and salicylic acid in this experiment. He recovered 1.324 g of salicylic acid and 1.247 g of $CuSO_4 \cdot 5H_2O$. What is the % of salicylic acid in the original mixture? What is the % of $CuSO_4 \cdot 5H_2O$ in the original mixture?

Solution:

According to the law of conservation of mass, mass of the initial mixture should be bigger (in case of losses during the separation of individual substances) or equal to the total mass of recovered substances. In our case, this condition is not satisfied: 2.498 g < 1.324 g + 1.247 g.

We can make a conclusion that there is a mistake in the condition of this task. We will assume that mass of mixture of $CuSO_4 \cdot 5H_2O$ and salicylic acid before the separation was 3.498 g.

The percentage of salicylic acid can be calculated in such way:

3.498g of original mixture is equal to 100 %

1.324g of salicylic acid is equal to X %

Then, X = 1.324*100/3.498 = 37.85 %.

The percentage of $CuSO_4 \cdot 5H_2O$ will be:

3.498g of original mixture is equal to 100 %

1.247 g of $CuSO_4 \cdot 5H_2O$ equal to Y %

Then, Y = 1.247*100/3.498 = 35.65%

Also, we can make a conclusion that in the initial mixture was 100 – 37.85 – 35.65 = 26.5% of impurities.