**Answer on Question #72209 – Chemistry – Inorganic chemistry**

**Question:**

Both sodium and calcium react with water to produce metal hydroxide and hydrogen gas…If 4 moles of hydrogen are obtained from 5 mol mixture of sodium and calcium metals .calculate the hydrogen percentage of each element in the mixture?

**Solution:**

Let's write the chemical equations which occur in mixture of two elements with water:

$$2Na + 2H_2O = 2NaOH + H_2$$

$$Ca + 2H_2O = Ca(OH)_2 + H_2$$
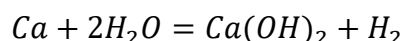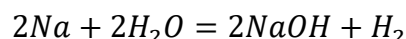
We know the obtained number of hydrogen from both of the reactions, Assume, that number of moles of hydrogen in each reaction is x and y. By this way, we can write simple mathematical equation:

$$x + y = 4$$

From the ratio of elements and hydrogen in reactions, one can note that number of moles of Sodium is 2x (Na:$H_2$ = 2:1) and Calcium is y (Ca:$H_2$ = 1:1):

$$2x + y = 5$$

If we solve the system of 2 mathematical equations we will find that x corresponds to 1 mol and y corresponds to 3 mol. By this way, percentage of hydrogen in chemical reaction with Sodium and Calcium corresponds to 25% and 75% respectively:

$$\eta_1 = \frac{n_{H_2}}{n_{1+2}} \cdot 100\% = \frac{1}{4} \cdot 100\% = 25\%$$

$$\eta_2 = \frac{n_{H_2}}{n_{1+2}} \cdot 100\% = \frac{3}{4} \cdot 100\% = 75\%$$

**Answer:** Hydrogen percentage is 25% and 75% from reactions with Sodium and Calcium respectively.