## Answer on Question#40598-Chemistry-Other

## Question

What is the colour when hydrogen peroxide reacts with potassium chromate?

## **Answer**

Potassium chromate solution is yellow. When reacting with hydrogen peroxide the latter is oxidized forming water and oxygen gas, and potassium chromate is reduced in generally from  $Cr^{+6}$  to  $Cr^{+3}$ . The exact reduction product and consequently the colour depends on the solution pH.

pH < 7 (acidic):

$$\label{eq:K2CrO4} \begin{array}{c} \text{K}_2\text{CrO}_4 + 2 \text{ H}_2\text{O}_2 + \text{H}_2\text{SO}_4 \Rightarrow \textbf{CrO}_5 + 3 \text{ H}_2\text{O} + \text{K}_2\text{SO}_4 \\ \text{yellow solution} & \textbf{dark blue solution} \end{array}$$

But the blue chromium(VI)peroxide is an unstable compound and after a few seconds it decomposes to turn green as chromium(III) compounds are formed, so the reaction may be written as follows:

$$2K_2CrO_4 + 5H_2SO_4 + 5H_2O_2 \rightarrow Cr_2(SO_4)_3 + 2K_2SO_4 + 4O_2\uparrow + 10H_2O$$
 yellow solution green solution

pH = 7 (neutral):

$$2K_2CrO_4 + 9H_2O_2 \rightarrow 2$$
Cr(OH)<sub>3</sub> $\downarrow$ +  $4$ KOH +  $6O_2\uparrow$  +  $4H_2O$  yellow solution **yellowish-green precipitate**

pH > 7 (basic):

$$2K_2CrO_4 + 2KOH + 3H_2O_2 \rightarrow 2K_3CrO_3 + 3O_2\uparrow + 4H_2O$$
 yellow solution light-green solution