Autoxidation.

(1)Turpentine and numerous other olefinic compounds, phosphorus and certain metals like Zn and Pb can absorb oxygen from the air in presence of water. The water is oxidized to hydrogen peroxide. This phenomenon of formation of H_2O_2 by the oxidation of H_2O is known as **autoxidation.** The substance such as turpentine or phosphorus or lead which can activate the oxygen is called **activator.** The activator is supposed to first combine with oxygen to form an addition compound, which acts as an **autoxidator** and reacts with water or some other acceptor so as to oxidize the latter. For example;

$$\underset{(\text{activator})}{Pb} + O_2 \rightarrow \underset{(\text{autoxidator})}{PbO_2} \qquad PbO_2 + \underset{(\text{acceptor})}{H_2O} \rightarrow PbO + H_2O_2$$

(2) The turpentine or other unsaturated compounds which act as activators are supposed to take up oxygen molecule at the double bond position to form unstable peroxide called **moloxide,** which then gives up the oxygen to water molecule or any other acceptor.

$$RCH = CHR + O_2 \rightarrow \begin{vmatrix} -RHC & CHR \\ - & | \quad | \\ & O \quad O \end{vmatrix}$$

$$\begin{vmatrix} -RHC & CHR \\ - & | \quad | \\ & O \quad O \end{vmatrix} + 2H_2O \rightarrow RCH = CHR + 2H_2O_2$$

$$2KI + H_2O_2 \rightarrow 2KOH + I_2$$

The evolution of iodine from KI solution in presence of turpentine can be confirmed with starch solution which turns blue.

(3) The concept of autoxidation help to explain the phenomenon of induced oxidation. Na_2SO_3 Solution is oxidized by air but Na_3AsO_3 solution is not oxidized by air. If a mixture of both is taken, it is observed both are oxidized. This is induced oxidation.

$$Na_2SO_3 + O_2 \rightarrow Na_2SO_5$$

Moloxide

$$\begin{array}{r} Na_2SO_5 + Na_3AsO_3 \rightarrow Na_3AsO_4 + Na_2SO_4 \\ \hline Na_2SO_3 + Na_3AsO_3 + O_2 \rightarrow Na_2SO_4 + Na_3AsO_4 \end{array}$$