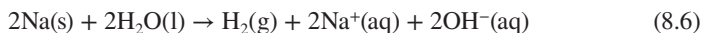


Usually, a 40% oxygen atmosphere allows for a rapid evaluation. Results should be compared against those obtained under inert or ambient atmospheres.

To test whether a compound is sensitive to oxygen, simply bubble air through the solution or add hydrogen peroxide, and assess the amount of degradation that takes place.

Focusing on the functional groups in a molecule allows us to recognize patterns in the behavior of related compounds. As an example, consider what we know about the reaction between sodium metal and water.



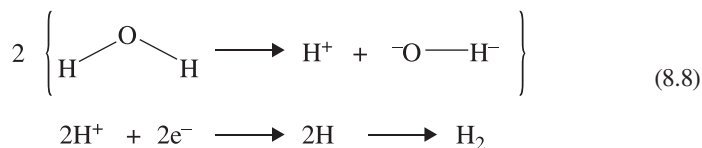
We can divide this reaction into two half reactions. One involves the oxidation of sodium metal to form sodium ions.

*Oxidation:*



The other involves the reduction of an  $\text{H}^+$  ion in water to form a neutral hydrogen atom that combines with another hydrogen atom to form a hydrogen molecule.

*Reduction:*



Once we recognize that water contains an  $\text{—OH}$  functional group, we can predict what might happen when sodium metal reacts with an alcohol that contains the same functional group. Sodium metal reacts with methanol ( $\text{CH}_3\text{OH}$ ), for example, to give hydrogen gas and a solution of the  $\text{Na}^+$  and  $\text{CH}_3\text{O}^-$  ions dissolved in this alcohol.



Because of the involvement of transfer of electrons, the reactions between sodium metal and either water or an alcohol are examples of oxidation–reduction reactions. But what about the following reaction, in which hydrogen gas reacts with an alkene in the presence of a transition metal catalyst to form an alkane?

