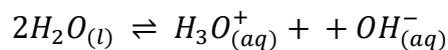




**Complete the autoionization reaction for water.**

The autoionization of water is a chemical reaction in which water molecules dissociate into hydrogen ions ( $H^+$ ) and hydroxide ions ( $OH^-$ ). The reaction can be represented as follows:



This reaction is an example of an acid-base reaction, in which water acts as both an acid and a base. The hydrogen ions are produced by the dissociation of the water molecules, and the hydroxide ions are produced by the acceptance of a proton by the water molecule. The autoionization reaction is an example of a self-ionization reaction, in which the ions are produced from the same substance that acts as the reactant.

The autoionization of water is an important chemical reaction because it plays a key role in the pH balance of aqueous solutions. The concentration of hydrogen ions and hydroxide ions in a solution determines the pH of the solution. A solution with a high concentration of hydrogen ions has a low pH (i.e., is acidic), while a solution with a high concentration of hydroxide ions has a high pH (i.e., is basic). The autoionization of water helps to maintain the pH balance in aqueous solutions by constantly producing hydrogen ions and hydroxide ions.